Commercial Fisheries Abstracts

a monthly summary of important developments for the fishery industries

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Commercial Fisheries Abstracts

Prepared in the Division of Industrial Research and Services
Bureau of Commercial Fisheries

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Following is a brief outline of this filing system. The numbers apply to the first digit appearing on each card. For the meaning of subsequent digits, please see the above described leaflet.

0 General and theoretical	5 Vitamins
1 Fish by species	6 Fishery byproducts
2 Fresh fish	7 Analytical Methods
3 Preserved fish	8 Composition
4 Oils	9 Miscellaneous

Use of funds for printing this publication has been approved by the Director of the Bureau of the Budget November 23, 1956.

0.34 INCLUSION COMPOUNDS

Baron, Maximo
Organic Chemical Bulletin 29, No. 3, 4 pp. (1957)

The paper discusses four types of inclusion compounds: (1) clathrates or cage-like inclusion compounds, (2) monomolecular inclusion compounds, (3) macromolecular inclusion compounds, and (4) products of the blue iodine reaction.

Six applications of inclusion compounds are discussed.

The Clathrates

Four characteristics of the clathrate inclusion compounds are given. They include: (1) the effect of structure on the ability of a given compound to crystallize in a cage-like structure, (2) the required strength of the cage, (3) the dependence on geometrical configuration of whether or not two compounds can form a clathrate, and (4) the possible composition of the clathrate once it is formed and the conditions under which the composition may vary.

Four compounds are discussed which will form clathrates with certain other compounds. They are: (1) hydroquinone, (2) tri-o-thymotide (structure given), (3) phenol, and (4) condensation product of mesityl oxide and phenol (structure given).

Monomolecular Inclusion Compounds

Whereas in the above cases more than one molecule crystallized into a cage-like structure thus

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ABSTRACTER: Phillip A. Hart

2.1121 SCANDINAVIAN EXPERIENCE WITH MIDWATER TRAWLING

Larssen, Karl-Hugo (Stockholm, Sweden)
Canadian Fisherman 44, 7, 9, 11 (December 1957)

Although the idea of catching schools of fish in midwater is not new, it is only in recent years that practical methods have been put into use. The problem of locating fish at mid-depths has been solved by development of asdic and echo-sounding equipment. Most pelagic trawling has been done in the Scandinavian countries, where it began during the war.

Systems in use.--Both one-boat trawls and two-boat trawls are in use. Each has advantages and disadvantages. The two-boat trawl has the advantage that no otter boards are required and nothing is in front of the net opening. The disadvantages of this system are the requirement for two vessels that are equal in all respects, and the problem of coordinating the two vessels in rough weather.

The one-boat trawl.-- The most serious problem with a one-boat midwater trawl is keeping the mouth sufficiently open, for which some type of trawl board is necessary. Regular bottom-trawl boards and floats are not well suited for pelagic trawls. It is essential in midwater trawling that the height and width of the net opening be independent of the speed. Shearing planes on the headrope and footrope are the answer, because they increase their effectiveness with increased speed.

Several methods of accurately determining the operating depth of midwater trawls have been tried, and there is still a demand for a simple, reliable instrument to accomplish this. Methods of calculating trawl depth by using the wire angle and length are not always dependable because of

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ABSTRACTER: Donald E. Powell

2.111 PRESERVATION OF FISHING GEAR - NETS

Anonymous
Dansk Fiskeritidende 74, p. 221 (May 11, 1956) (Copenhagen, Denmark)
World Fisheries Abstracts 8, 15-16 (September-October 1957)

In Denmark, a series of experiments have been carried out over a range of years to find and test the most effective net preservatives. Treatment with cutch alone does not give much protection, and fixation afterwards is necessary. But the treatment with cutch and fixatives have certain disadvantages. During the last few years, experiments with hexachlorophenol have proved promising. This chemical is dihydroxyhexachlorodiphenyl methane, at present mainly used as an additive to soaps and cosmetics,and is known for its bactericidal effect. The chemical has not been used before for impregnating fish nets or textiles. In Denmark, experiments were carried out by placing variously treated material in a tank at proper temperature and containing a high concentration of bacteria causing decay of the nets. In this tank, ordinary untreated cotton twist will decay in 8 to 14 days. In the tank were placed samples of cotton twisted yarn treated with preservatives together with untreated samples. When the untreated material was completely decayed, this was the end of 'one period.' The strength of the treated material was now tested and put into the tank again together with a new untreated sample. The number of periods through which the treated samples will last is an expression of the effectiveness of the preservative. Cotton twisted yarn treated with cutch and subsequent fixation keeps for more than 20 periods. The majority of commercial preservatives lost their strength after 2 periods. Cotton twisted yarn treated with hexachlorophenol will keep for 8 periods. The conclusion is that hexachlorophenol gives a considerable protection even if it does not compare with treatment with cutch and fixation. In practical experiments, bottom gill nets were treated with hexachlorophenol and thereafter tarred. Other nets were treated with tar containing hexachlorophenol. After 2 seasons, the nets so treated were somewhat weakened, but could be used for a 3rd season.

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ABSTRACTER: Birger Rasmussen

2.1121 THE "EXOCET" TRAWL DEVICE--GEAR GIVES LIFT TO HEADLINE IN ALL CONDITIONS

Anonymous
World Fishing 7, 38 (January 1958)

New methods of observing the underwater trawl have disclosed shortcomings in the action of conventional floats. They have been found to lose some of their lifting power at high trawling speeds, and they also tend to oscillate, which causes a loss of efficiency and can result in damage to the nets.

Manufacturers are trying to minimize this trouble and thus improve the efficiency of their floats. One of the devices that have been developed is a headline elevator developed in France. The headline elevator is a semi-rigid assembly of light alloy. It consists of a tubular frame that is attached to the headline with a rectangular panel flexibly mounted above it at a 30° angle. The planing angle of this panel provides the lifting action of the headline elevator. Mounted in the leading edge of the panel are two or more spherical floats made of alloy that provide static lift and, by their buoyance, set the panel at its lifting angle. The assembly is attached to the center of the headrope after a section of the net has been cut away to accommodate it. The cut meshes then are rebolshed onto a dummy headrope on the frame of the elevator.

The shooting of gear that is equipped with a headline elevator is not complicated because no long wires or ropes are employed. The manufacturers of the headline elevator claim that their equipment is not affected by changes, of course, or by uneven towing strains in bad weather. The improved height of headline achieved by use of the headline elevator has been credited with increasing the catch of a trawl up to 300 percent.

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ABSTRACTER: Kathryn L. Osterhaug

INCLUSION COMPOUNDS

NET PRESERVATION

MIDWATER TRAWLS

HEADLINE ELEVATOR FOR TRAWL

2.111

Another net which had been treated with cutch, fixed and tarred showed no reduction in strength, while 2 nets treated with other preservatives had to be condemned.

Although the experiments are not concluded, the following instructions are given: hexachlorophenol is a white powder soluble in methylated spirits, acetone, etc. The nets should be placed in a solution containing at least 3% hexachlorophenol for at least ½ hr., and thereafter hung up for drying. This preservation is satisfactory for nets which are to stay in water only for a short period. New nets which normally are tarred should first be treated as above. After 1 day of drying, they should be treated with tar containing at least 3% hexachlorophenol. All later treatments with tar should include this chemical. Finally, it is emphasized that treatment with hexachlorophenol does not compare with that followed by fixation, and the latter method should be used whenever possible. But in cases where nets become too hard and inflexible the hexachlorophenol method should prove advantageous.

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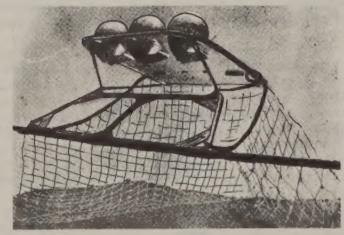
"Exocet" 80



0.34 (Cross Reference: 4.29)

accommodating the "guest," the monomolecular inclusion compounds are composed of one "guest" and one "host" molecule. Two compounds are given which form monomolecular inclusion compounds (α-, β-, and γ-cyclodextrins and Bis-N, N'-alkylenebenzidines).

Macromolecular Inclusion Compounds

The zeolites and the bentonites are shown to be compounds which form macromolecular inclusion compounds and the mechanism of formation of these compounds is given.

Products of the Blue Iodine Reaction

The structure of the starch-iodine complex is explained and the remaining compounds that form blue addition compounds with iodine are given. They are: (1) the flavones, (2) coumarin, (3) benzophenone, (4) benzamide, and (5) barbituric acid.

Applications

The six applications are: (1) separation of compounds from complex mixtures, (2) prevention of oxidation, (3) separation of optical isomers, (4) preparation of surface active agents, (5) drying agents, and (6) equilibrium displacements.

Twelve references are given.

2.1121

the action of currents on the trawl.

Influence of echo-sounding. --Some interesting observations were made while using echo-sounders during night midwater-trawling in the Skagerack. Apparently the echo sounder did not disturb the shoals of fish during the tow, but at the end of the tow when deck lights were turned on the shoals dispersed. Shortly after the lights were turned off the fish again appeared as before. Pelagic trawling near the sea bed may produce greater catches in the future.

Types of pelagic trawls. -- The three best known pelagic trawls used in Scandinavia are (1) Robert Larsen's two-boat trawl, (2) Sterner Persson's one-boat trawl, and (3) the so-called Phantom Trawl designed by the author. The Phantom Trawl was developed after extensive tests results of which have been reported.

2.111 SELECTION OF CORRECT THREAD THICKNESS OF NYLON FOR GILL NETS

Sunnana, K.
Me'A 11, p. 17 (June 15, 1956) (In Norwegian)
World Fisheries Abstracts 8, 11-12 (November-December 1957)

Some misunderstanding still exists regarding the correct strength of nylon thread because many fishermen do not take into consideration the fact that nylon loses 10 to 15% of its strength when wet in addition to the considerable loss of strength caused by the knots. In Norway, different materials have been tested to illustrate this fact. For the experiments cotton and hemp threads ordinarily used in cod gill nets were employed, and nylon threads which were tested in 3 thicknesses, and produced from filament yarn and continuous fiber. To obtain comparative results, the threads were soaked in fresh water for 12 hrs. The results of the tests are shown in the table (see over). As indicated in the table, a cotton thread 12/12 measuring 1,450 m. /kg. (360 fm. /lb.) has a breaking strength in the knot when wet of 11.3 kg. (25 lb.). A nylon thread measuring 2,200 m. /kg. 3,300 ft. (lb.) has practically the same breaking strength, e.g. 11.8 kg. (26 lb.). From the tests, the following conclusions may be drawn: when selecting a nylon net to replace a cotton net of, e.g., No. 12/12, a nylon thread measuring 2,200 m. /kg. must be selected to obtain a net of equivalent strength, or, as a general rule, to increase the meter (fathom) length/kg. (lb.) of cotton by 50% to get the approximate nylon number. Even if a nylon net is chosen according to this rule, the nets should not be exposed to greater stress than ordinaily used in nets of hemp or cotton.

See table, over.

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ABSTRACTER: Birger Rasmussen

2.1121 DEVELOPMENT OF A NEW HERRING TRAWL FOR USE IN MIDWATER OR ON THE BOTTOM

Barraclough, W. E. and Needler, A. W. H. (Fisheries Research Board of Canada, Nanaimo, B.C.)
Canadian Fisherman 44, 3, 5, 11 (December 1957)

In 1951 Canadian herring fishermen began trying European-style midwater trawls for taking autumn and winter herring in British Columbia waters. In 1954 the Fisheries Research Board's Biological station at Nanaimo, B.C. undertook the development of a midwater trawl and associated gear for use on single boats of about 150 to 175 horsepower.

Construction of trawl and associated gear. --The use of nylon and the technique of brailing fish from the cod end allowed the employment of light netting with little water resistance. The net is 35-feet square and 180-feet long. Mesh sizes range from 5 inches in the wings and square to $1\frac{1}{4}$ inches in the cod end. The four 75-foot "head" ropes are of combination wire-manila. Rib lines are 5/16-inch braided nylon. The "zipper" cod-end opening is 36-feet long. Curved, $5\frac{1}{2}$- by 3-foot plywood otter-boards with stabilizing fins are suspended from 10-fathom pennants. Eleven aluminum, planing trawl floats are attached about 2 feet apart in the center of the top "head" rope. A lead-line of braided nylon with about 25 pounds of small sectional leads is attached along the bottom "head" rope at 18-inch intervals. Depressors are used on the towing lines just ahead of the lower wings. The towing lines (dandylines) are 3/8-inch galvanized wire rope 30-fathoms long.

Operation of the trawl. --Herring are located with an echo sounder. The net is shot over the stern. Trawl depth is controlled by speed and by the length of the towing warps and is calculated from the angle of descent of the warps. In hauling, the otter-boards, depressors, and body of the net are brought aboard and the cod end is secured alongside before opening the "zipper" to make the catch

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ABSTRACTER: Melvin R. Greenwood

2.1128 THE ARROWHEAD FISH POT -- TROPICAL GEAR WHICH HAS POSSIBILITIES IN NORTHERN WATERS

King-Webster, W. A.
World Fishing 7, 62-64 (January 1958)

The arrowhead fish pot is a device useful for catching fish on bottom that is too rough for trawling or in waters that are closed to trawling and seining. It is used extensively in the tropical countries around the Indian Ocean, and has been introduced in the West Indies. The "bu-bu," a rectangular pot with similar fishing action, is used in the Western Pacific and in the East Indies. In the tropics, catches consist mainly of snapper and grouper. Limited trials off the coast of Scotland have demonstrated that the arrowhead fish pot will catch codling. This indicates that it has potential value as a cod trap in northern latitudes.

The fish pots originally were made of woven strips of split bamboo or of other basketwork. Ordinary wire netting now is replacing these materials.

The effectiveness of fishing with fish pots in comparison with other methods of catching fish has not been evaluated. No statistical information is available to indicate average yields. The primitive method presently used to haul these pots is extremely wasteful of manpower. Modern equipment and methods could be used to substantially increase the yield per man hour. One advantage pot fishing has over other methods is that, provided the pots are set deep enough to be safe from storm damage, they will fish continuously even when the boat used to set them out is stormbound in harbor.

Details of pot construction. --It is generally agreed that to catch large fish, large pots are required. In some of the West Indian islands, pots 8 or more feet across are used, but the following instructions cover the standard 5-foot pot used in Trinidad. For this size, wire netting either 3 feet or 6 feet high may be employed. With the former, pots are made singly, although it is possible to make a single pot from 6-foot wire. Twenty feet of 3-foot wire or 10 feet of 6-foot wire is required for each pot. The size of mesh depends on the size of fish sought. It should be just too small for them to gill themselves.

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ABSTRACTER: Kathryn L. Osterhaug

2.15 STOWAGE OF FISH AT SEA IN BOXES

Anonymous
Report of the Food Investigation Board (Great Britain) for 1956, pp. 7-8 (1957)

Introduction. -- Ways are continually being sought for improving the techniques of stowing fish aboard trawlers at sea. Studies of the effect of boxing on the quality of fish taken from distant waters have been initiated. In addition, a theoretical study has been made to learn the limitations in the design of boxes and supports as related to the space in the hold of a trawler. If boxes are used to replace shelves, more hold space will be required aboard the trawler.

Effect of fish gills on keeping quality. --Fish with gills intact usually develop stronger and more readily discernible odors in the raw state than fish from which the gills have been removed at the time of evisceration. Differences in the quality of the cooked fish prepared from gilled and from ungilled eviscerated fish, however, could not be detected.

Effect of clean boxes. -- Previous findings have shown that the bacterial load of the ice used in icing fish has considerable influence on the keeping quality of the iced fish. Clean boxes also are of importance of retaining quality. To study the problem, the investigators carefully eviscerated, washed codling and packed them in new wooden boxes and in used wooden boxes. The used or dirty boxes had a bacterial load of 10,000 to 1,000,000 times the bacterial load of the new or clean boxes. Clean ice was used throughout this study. According to the results, which have not been fully analyzed, the effect of the cleanliness of the fish box on keeping quality is of the same order of magnitude as the effect of the cleanliness of the ice.

Fish that had been iced in clean boxes usually were organoleptically superior to fish that had

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ABSTRACTER: Martin Heerdt

NYLON GILL NETS

MIDWATER HERRING TRAWL

ARROWHEAD FISH POT

BOXES FOR ICED FISH AT SEA

2.1121

available for brailing.

Dual-purpose otter-board. -- The plywood otter-boards work well at mid-depths, but are easily damaged upon contact with the bottom, which is likely when attempting to catch herring near the bottom. A V-shaped dual-purpose aluminum otter-board, which is stable in midwater at speeds of 2 to 6 knots, was developed in 1956.

Early fishing tests. --Herring in B. C. waters during January and February occur in dense, 5- to 10-fathom thick layers and tend to rise toward the surface in the evening and descend at daybreak. Catches during these times were 20 to 30 tons per 30-minute tow. Catches were smaller at night. Two daylight tows caught 15 and 35 tons. The more active autumn fish were taken in amounts of 5 to 15 tons per half hour at mid-depths and in amounts of 20 to 75 tons in 20- to 30-minute tows with the net "flying" just off the bottom. Conventional otter-boards, which ride the bottom, were used.

Commercial use of the trawl. --In the late autumn and winter of 1955 to 1956, fishing close to the bottom with conventional otter-boards, seven trawlers took 2,000 tons of herring, averaging 5 to 6 tons per half-hour tow. In the winter of 1956 to 1957, 19 trawlers took part in the fishery.

Midwater trawls for faster-swimming fish. -- Work is continuing on the development of a midwater trawl capable of catching the more active summer herring and other fast-swimming fish. Two approaches are being made to the problem: (1) a small, strong net, for towing at fast speeds and (2) slow-moving trawl with a large opening.

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Treatment of material and breaking strength	Cotton thread No. 12/12 Egyptian 1,450 m./kg.	Hemp thread No. 73 Italian 1,430 m./kg.	Nylon thread spun from filament yarn		
			3,200 m./kg.	2,400 m./kg.	2,200 m./kg.
Dry without knots, in kg.	12.4	18.5	19.1	23.5	26.0
Wet without knots, in kg.	14.4	23.4	16.7	20.0	21.1
Wet with knots, in kg.	11.3	17.8	8.8	10.0	11.8
Breaking strength of wet thread with knots as % of breaking strength when dry and without knots	91.1	96.2	46.0	42.6	45.3
Reduction in strength (%)	8.9	3.8	54.0	57.4	54.7

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been iced in dirty boxes, particularly from the standpoint of appearance of the flesh of the raw fish. After both lots of iced and boxed fish had been in storage for 12 days, fish iced in clean boxes were about 1 to 3 days fresher organoleptically than fish that had been iced in dirty boxes. After 16 days of storage in ice, however, these differences were less obvious. Fish that had been washed before they were boxed in ice showed some improvement in the retention of quality but this fact was not as apparent as the effect of cleanliness of the box. A survey of the bacterial load borne by commercially boxed fish in commercial channels has been made, and results of this study will be published in the near future.

Methods for cleaning boxes. --The Humber Laboratory at present is engaged in a study of the efficiency of commercial detergents and sanitizers for use in the fishing industry. The cleaning and the sterilizing of wooden surfaces present a particularly difficult problem to the fishing industry. A series of articles on the principles of scientific cleaning have been prepared for publication in trade journals.

Properties of commercial ice. --Representatives of the fishing industry have requested that a study be made to determine if there is a basis for a belief that manufactured ice from various sources varies in efficiency during use. Rates of melting of the various ices will be determined. The rate of the melting of ice under practical conditions probably is subject to considerable variation that depends (1) on differences in air temperature, (2) on the drafts to which the ice is exposed, and (3) on the pattern of melting. Melting patterns involved in the formation of crevasses and ice bridges will be studied. Experiments to date have shown that wide variations in particle size distribution have very little effect on the rate of melting.

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Other materials required are wooden sticks or battens for the framework and thin, galvanized, seizing wire nails. Most West Indian pots have a framework of thin grown sticks, mangrove or certain forest woods being used, but straight-grained sawn battens have been found satisfactory where suitable sticks were unobtainable. Using battens, a pot requires four that are 6½ feet by ¾ inch by 3/8 inch; ten that are 3¼ feet by ¾ inch by 3/8 inch; and seven that are 1½ feet by ¾ inch by ¾ inch. The last are for the uprights. The ideal wood would be tough, of high specific gravity, and able to take nails well; but as these qualities are not generally all found together, the best compromise available should be used.

Each pot consists of top, bottom, and sides. When a single pot is made, the sides are cut out in two parts, which must be joined end to end, but when a pair of pots is cut from 6-foot wire, the sides of each pot are cut out as a single, continuous strip.

Except when the mesh is very small, the cut wires are themselves used for joining the parts of the pot together. Seizing wire thus is only needed where there is a selvedge and for lacing in the wooden framework.

It is advisable to join the sides onto the bottom and to complete the funnel before adding the top. Funnels are of two kinds. The simpler one is made by bringing the ends of the strip of netting that forms the sides together in the apex of the concave V. Then by cutting them to a partial taper and joining the upper and lower edges of the tapered portion, a tapered tube of netting is formed. As this design gives an easy entry but also a comparatively easy exit, it is most effective for fish that are shy of entering really confined spaces. The more complicated funnel, which is used in Trinidad, gives a down-curved entry that is harder to negotiate when a fish is going in but is almost impossible to see from inside if a fish is trying to get out.

Means also must be provided for removing the catch. It is the usual practice simply to unlace the wire joining the side and bottom at one corner. However, considerable fishing time can be saved by cutting out a small square of wire netting from the side and braiding in a piece of twine net with a lacing across the middle.

2.1124 FISHING METHODS AND GEAR - TRAPS - POUND NETS

Kothke, H. and Klust, G.
Archiv. fur Fischereiwissenschaft 7, p. 93 (October 1956) (Braunschweig, W. Germany)
World Fisheries Abstracts 8, 17-18 (September-October 1957)

Since the large rivers have been developed into waterways used by ships, the river fishery has to face increasing difficulties in using various types of gear, like bag nets, for eel fishing. But owing to the introduction of an otter board stow net to replace the fixed nets, the river fishery has no longer to renounce this profitable fishery. The otter board stow net is a large bag net. It differs from the usual bag net in so far as it has no frame in the mouth to keep it open. The net is kept open vertically by metal tubes (8 cm. or 3-1/8 in.) in diam., but the problem of horizontal stretching is solved in a different way. Wings are attached to the mouth, one of which is connected to the shore by a rope, whereas the other is fastened to an otter board floating on the surface of the river. Thus, the mouth opening width may amount to 40 to 50 m. (131.2 to 164 ft.) and the fishing range is substantially increased. The otter board is set against the current which keeps the net open. The size of it depends on the local conditions. On the upper Elbe it is 3.5 m. (11½ ft.) in length and 2.8 m. (9.2 ft.) high. A control fin is attached to the end, which can be adjusted from the river bank by means of a connecting wire. This wire is tightened from the shore by a winch when the control fin turns and is pressed then towards the shore by the water current. When the connecting wire is relaxed, the otter board moves from the bank. The angle required for moving the otter board in the desired way has to be tried and adjusted always depending on the current. By means of this equipment, it is possible to remove the net at any time from the shipping channel also to readjust it in the river for fishing. However, the best eel catches are sometimes taken in the river sections with heavier currents, used by ships. The net itself is made of Perlon staple twines. In the anterior part of the net, the Nm 20/36 (Ne 12/36) twine is used. Towards the end, the twine becomes gradually thinner. The tensile strengths of these twines are particularly suited for these purposes. In case of heavier strain, the

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 ABSTRACTER: A. von Brandt

2.40 FRESH FISH 3. CHILLED STORAGE OF HAKE

Cooper, C. E. B. and Rousseau, C. E.
Annual Report, Fishing Industry Research Institute, Cape Town, South Africa 9, 8-9 (1955-1956)

Purpose and experimental plan. --Possible differences in the storage life of two different sizes of trawl-caught hake were studied. These hake were headed and gutted, packed in crushed ice, delivered to the laboratory less than 24 hours after removal from the sea, and divided into two weight groups. Group 1 contained hake weighing from 1½ to 2½ pounds, whereas group 2 contained hake weighing from 4 to 6 pounds. Their rates of decomposition during storage in crushed ice were compared on the basis of belly cavity odor, flesh odor when separated from the backbone by a deep internal cut, and odor of the steamed and broiled flesh.

Findings. -- The external appearance of the skins and cut surfaces and the flesh firmness of the two size groups did not differ significantly. Comparisons of hake caught during February and March showed that large hake stayed fresh for 8 days without the development of objectionable odors in raw or cooked samples. On days 9 and 10, however, the larger fish were judged to be off in odor. Small hake remained fresh for an average of 7 days, after which they were judged off in odor. Further comparisons will be made throughout the year, particularly during the winter when the storage life of hake is believed to be rather long.

Humid vs. dry atmospheres. -- Hake stored at 70° to 75° F. and 95 percent relative humidity were compared for deterioration with hake stored at the same temperature and 30 to 35 percent relative humidity. These hake were suspended in still air in sealed containers. Their condition (deterioration) was evaluated by the degree of off odor development in the belly cavity.

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 ABSTRACTER: Martin Heerdt

2.2 CALIBRATION OF FISH WEIGHING DEVICES

Stander, G. H. and Matthews, J. P.
Annual Report, Fishing Industry Research Institute, Cape Town, South Africa 9, 24 (1955-1956)

Bucket "scales" are used as volume measuring devices in fish meal factories. They require regular calibration by means of a series of check weighings. This calibration is time-consuming and inconvenient in factory operation.

Purpose. --A study was made at Walvis Bay in an attempt to simplify the task of calibration. By making periodic check weighings at one factory, the investigators planned to obtain a correction factor that could be applied to all bucket scales in use.

Laboratory studies. -- Pilchards were found to vary in bulk density between 51.6 and 54.3 pounds per cubic foot (average 53.3 pounds). Pilchards caught over a 10 day period varied between 4.3 and 6.4 percent fat. Their bulk density appeared to be inversely related to their fat content. If the volume measuring container were jolted as it was being filled, an increase of up to 10 percent bulk density could be obtained.

Factory studies. --The bucket scale at each factory consisted of a cylindrical drum, divided into six equal sectors by means of vanes fitted to a central shaft. Five buckets of fish were usually measured for each factory test, and all fish measured were less than 12 hours out of water. Variations of from 49.8 to 58.5 pounds per cubic foot (average 53.4 pounds) were found in the bulk density of pilchards measured by these scales. Differences in bulk density were sometimes encountered from day to day and even from boat-load to boat-load landed on the same day. Weighings made at the same factory on two consecutive days showed a density of 53.7 and 57.9 pounds per cubic foot, whereas

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 ABSTRACTER: Martin Heerdt

2.9 THE NUTRITIVE VALUE OF MARINE PRODUCTS XVI. THE BIOLOGICAL VALUE OF FISH-FLESH PROTEINS

Beveridge, J. M. R. (Pacific Fisheries Experimental Station)
Journal of the Fisheries Research Board of Canada 7, 35-49 (February 1947)

The biological values of the flesh proteins of lingcod, halibut, lemon sole, and white spring salmon were determined by growth and nitrogen-retention methods, using young Wistar rats as experimental animals. Values obtained by the growth method only are reported for herring and red snapper.

Experimental procedure. --The fish were prepared as fillets or steaks, cooked one hour in a steam autoclave at 99° to 100° C., pressed, minced, and partially dehydrated in a warm-air tunnel at 60° C. The fat was removed from the cooking liquor, and the liquor was evaporated to a thick syrup under vacuum on a water bath at 40° to 50° C. The concentrate was added to the partially dried fish flesh, and the mixture was dried at 50° C. to a moisture content of 2 to 4 percent. The preparations then were ground into a fine meal. Beef flesh used for comparison was treated in the same manner after all visible fat and connective tissue had been discarded. Before feeding tests were undertaken, moisture, nitrogen, and fat were determined for each protein product.

Rats of an initial weight of 50 ± 2½ grams were used for the feeding tests. The feeding period was 28 days at a protein level of 8 percent.

Results. --The gains brought about by the fish-flesh proteins were shown to be significantly greater than those brought about by the beef-flesh proteins. The biological value of egg albumin was the same as that of the beef.

The biological value of the proteins of halibut, beef, and casein also were compared at a protein level of 12 percent. The biological values of the two flesh proteins were found to be significantly greater than the value of casein, and the value of halibut was significantly greater than that derived

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 ABSTRACTER: Kathryn L. Osterhaug

OTTER BOARD STOW NET

FISH WEIGHING DEVICE

CHILLED STORAGE OF HAKE

VALUE OF FISH PROTEINS

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weighings made at two different factories on the same day showed 53.6 and 57.9 pounds per cubic foot. These variations in bulk density were based on (1) fat content and texture of the fish and (2) details of design of the scale and accuracy of the clearances between the sector divisions and the drum. During September, firm fish that averaged 5.6 percent fat had an average density of 51.2 pounds per cubic foot. During October soft fish with an average fat content of 4.3 percent had an average density of 55.7 pounds per cubic foot.

Conclusions.--These findings indicate that the calibration of bucket scales in terms of cubic capacity does not appear to be feasible.

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from beef-flesh proteins.

Table 5.--Biological values of halibut and beef flesh proteins. Initial wt. of rats: 50 ± 2.5 g. Days on test diets: 28. Basal diet: D.

Source of dietary protein	Sex	No. of rats	Daily food intake (g.)	Av. gain in wt. (g.)	Gains corr. for food intake (g.)	Gain in wt. per g. protein eaten
Halibut	M	17	12.4	138.3	135.7	3.32
Halibut	F	16	10.5	95.6	95.7	2.66
Beef	M	17	12.0	126.9	129.4	3.15
Beef	F	16	10.6	91.7	91.6	2.58

Table 6.--Biological values of casein and flesh proteins of beef and halibut. Initial wt. of rats: 50 ± 2.5 g. Days on test diets: 28. Basal diet: D.

Source of dietary protein	No. of rats	Av. daily food intake (g.)	Av. gain in wt. (g.)	Gains corr. for food intake (g.)	Gain in wt. per g. protein eaten
Halibut	6	12.3	136.1	130.7	3.30
Beef	6	12.2	129.7	126.2	3.19
Casein	6	10.8	104.8	115.0	2.89

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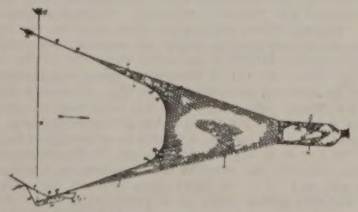
anterior part of the net should be made of plaited continuous Perlon.



1. Main hawser.
2. Buoys
3. Shearing angle chain
4. Main chain
5. Otter board
6. Control fin
7. Wings
8. Land hawser
9. Barrier beams
10. Separating seams
11. Stow net
12. Bag or cod end
13. Funnel
14. Control rope
15. Guide roller for the control rope
16. Iron frame

2.40 (Cross Reference: 3.17)

Comparisons of similar hake showed that hake held under humid conditions developed fishy, sour odors within 20 hours; whereas hake stored under relatively dry conditions were either fresh smelling or possessed only slightly fruity odors after 20 hours of storage. Both groups of hake had developed objectionable odors after 30 hours of storage. Hake stored at the low relative humidity showed surface drying.

Sodium benzoate dips.--Earlier studies have shown that the storage life of trawled hake can be extended by dipping the hake before they are iced in a solution that contains a preservative such as sodium benzoate. A further confirmatory test of sodium benzoate dips was carried out aboard the trawler Gilia during May of 1955. In this study, headed and gutted hake weighing 2 to 3 pounds were dipped immediately after they were gutted--in groups of 24--for 30 minutes in 8 gallons of either 1 percent sodium benzoate dissolved in fresh water or 1 percent sodium benzoate dissolved in 10 percent brine. A third group of 24 hake was retained undipped as a control. All 3 groups of hake were then stored separately in crushed ice.

Hake that had been dipped in either of the benzoate solutions remained fresh and without the development of objectional odors in raw or cooked samples for 11 days. These fish, however, were judged off in odor after 13 to 14 days of storage. Undipped control hake remained fresh for 8 days after they were caught. These hake were judged off in odor after 10 to 11 days.

2.143 FISHING METHODS AND GEAR - ELECTRICAL

Anonymous
La peche maritime, la peche fluviale et la pisciculture 35, p. 498 (November 1956) (In French)
World Fisheries Abstracts 8, 17-18 (November-December 1957)

The electrofishing method is based on electrotaxis which means that when fish are placed in an electric field, they swim towards the anode. A weak A.C. can irritate the fish and drive them away from certain areas. Therefore, it can be used to guide fish.

An electric fishing system was set up in the lavina river Kamchatka, U.S.S.R. In 175 hrs., 961 quintals (211,800 lb.) were fished as compared to 657 quintals (144,800 lb.) taken in the same length of time by fishermen with traditional nets. The end of the suction hose was connected to the anode of a high voltage D.C. generator, the cathode being connected to plates properly disposed around the suction area. The electric field drives the fish towards the suction of the pump. In a few sec., the sucked fish were sent into the intermediary tank where they could be kept alive for 5 to 6 days. For successful operations, slightly salted water with a resistance between 1,000 and 10,000 ohms/cm. is preferable; above 10,000 ohms, the results are not so good. The range of the electric field was less than 3.5 m. (11.4 ft.); for this reason, a weir was built across the river, leading to a narrow adjustable pass so that a certain number of fish could migrate upstream for spawning. The suction hose was 21 m. (68.9 ft.) long. A rack conveyor brings the fish from the butchering place to the salting vats.

The whole installation needed a power supply of 40 to 45 kw., 6.5 kw. of which were used for actual fishing. The weir was made of 7 to 8 mm. (1/4 to 5/16 in.) diam. metal rods, 28 to 30 mm. (1-1/8 to 1/316 in.) apart. One rod out of 4 or 5 had low voltage A.C. In spite of the large space between the electrified rods, the fish did not approach the weir. One advantage of electrofishing is that the

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 ABSTRACTER: Jacques Chaux

ELECTROFISHING

3.239 CHANGES IN THE MYOSIN FRACTION OF FISH MUSCLE DUE TO FREEZING, STORAGE, AND THAWING

Nikkila, Olavi E.
Nordisk Kjolemote, pp. 3-7 (1957) (In Swedish)

Oxidation of fat and denaturation of protein take place during the frozen storage of such animal products as fish and meat. The oxidation of fat can be retarded effectively by protecting the products from oxygen and by storage at very low temperatures.

Denaturation of muscle protein takes place during freezing, storage, and thawing, and is accelerated by the use of certain substances, such as salt, that are used to lower the temperature. In this report, the discussion is limited to changes in the solubility of actomyosin.

Denatured fish-muscle protein is no longer soluble in water or in weak salt solutions. Other characteristics of the protein also may be changed, including the SH-, SS-,and tyrosine groups. The diffusion and sedimentation rates of denatured proteins are different from those of the native protein. Most of the changes take place in the actomyosin fraction of the muscle tissue. Denatured muscle tissue loses its ability to swell, to maintain turgidity, and--on thawing--to regain its relaxed status. Denatured meat and fish tissues seem dry and have a characteristic "wooden" or "frozen" flavor.

In addition to changes that can be detected organoleptically, protein denaturation can be evaluated objectively by measuring the amount of free drip that is formed and by determining the solubility of the actomyosin. To determine the solubility of actomyosin, fish flesh is ground very fine in a top-drive macerator that revolves 10,000 times per minute, and then is made into a weak salt solution (5 percent NaCl) in which the myosin becomes soluble. The extract is centrifuged, and the clear fraction is diluted with water to precipitate the myosin. The myosin from the muscle

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 ABSTRACTER: Kathryn L. Osterhaug

DENATURATION OF FISH FLESH

3.2344 RAINBOW TROUT FREEZING IN JAPAN

Kato, S.
Proc. 9th International Congress on Refrigeration, Paris, 1955, pp. 4 051-4 157, 4 092-4 095
Food Science Abstracts 29, 421-422 (October 1957)

Only at Fujimiya in Shizuoko Prefecture and at Akashina in Nagano Prefecture are there facilities for freezing trout adjacent to the growing ponds. Trout (Salmo irridens) from all of the other growing area of Japan are transported to Tokyo or other large cities for freezing.

Freezing plants in these cities are modern in design and are usually equipped with contact freezers. Sharp freezers and air-blast freezer tunnels are used in some of the plants.

One of the major problems in the transportation of fresh trout is the maintenance of freshness during transportation from the ponds to the freezer, an operation that requires 10 to 15 hours.

Packing for transit.--The most satisfactory method of packing trout for transit is as follows: Place the live fish in a mixture of salt and ice. Eviscerate them as soon as they are motionless. Wash them and pack them in a wooden box between layers of crushed ice sprinkled with salt. Flood the box with sufficient water to just fill all of the air spaces between the ice and between the fish.

Advantages of a packing medium.-- The above method of packing allows free circulation of the cooling medium around the individual fish and maintains a degree of freshness that corresponds to rigor mortis and lasts almost until the fish arrive at the freezing plant. On arrival at the plant, the trout are held under refrigeration until they are frozen, usually within 25 to 26 hours after capture. Data on the rate of cooling of the trout in crushed ice alone or in crushed ice with added salt, added

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 ABSTRACTER: Martin Heerdt

FREEZING TROUT IN JAPAN

3.239 BIOCHEMICAL CHANGE IN THAW-RIGOR IN RELATION TO THE QUALITY OF FROZEN FISH

Amano, K.; Bito, M.; and Suyama, M.
Proc. 9th International Congress on Refrigeration, Paris, 1955, pp. 4 066-4 073, 4 092-4 095
Food Science Abstracts 29, 428-429 (October 1957)

Frigate mackerel, jack mackerel, and yellowtail were used to determine the most desirable condition of freshness for raw freezing. The three species of fish had been killed either by destroying the motor nerve immediately after capture or by allowing the fish to struggle until it died.

Experimental.--Muscle tissue from these fish was removed immediately after death, sealed in polyethylene bags, and frozen in dry ice.

Results.--Jack mackerel in rigor and held at 14° to 15° C. while being thawed (in thaw-rigor) were assayed at intervals of 1/2, 1, 2, 4, 6, and 8 hours for changes in biochemical composition. During thaw-rigor, adenosinetriphosphate, glycogen, and sulphydryl groups decreased rapidly; and lactic acid and ammonia were formed.

The rate of splitting of glycogen during the storage of muscle homogenates for eight hours at 30° C. was similar irrespective of whether the homogenates were prepared from fresh or from frozen fish. With fish that had struggled before death, however, the rate of splitting of glycogen during the storage of muscle homogenates was much greater than it was with fish that had been killed instantly.

The muscle of frigate mackerel that had been killed instantly froze much more slowly than did

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 ABSTRACTER: Martin Heerdt

CHANGES DURING THAW-RIGOR

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brine, or added water were also obtained in this study.

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the muscle of frigate mackerel that had been allowed to struggle before death. Frozen yellowtail muscle decreased in myosin content and gradually increased in myogen content during storage for 33 days at -15° C. In frozen muscle from yellowtail that were killed instantly, however, the myosin content increased and the myogen content decreased rapidly for the first day after freezing, until the values were similar to those of frozen muscle from fish that had struggled before death.

The frozen muscle from fish that had been killed instantly appeared to contain an additional protein that probably is an intermediate compound in the formation of actomyosin. Fish that are killed instantly are preferable for freezing because the myosin fraction is less susceptible to denaturation. To keep fish as fresh as possible before freezing and to prolong the period of prerigor, the authors recommend cutting the motor nerve or electrocuting the fish immediately after capture.

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young fish are not influenced by the electric field and need a much stronger field than larger fish. Selective fishing is thus possible.

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extract of small Baltic herring, for example, can be precipitated quantitatively by diluting with water in the proportion of 8 grams of water per gram of extract or by dilution of the extract in a salt solution of the same concentration, namely 0.11 mole at 0° to 5° C.

Denaturation is dependent chiefly upon the composition and the freshness of the muscle. The degree of denaturation is greater, however, if the muscle is frozen and stored during the onset of rigor mortis than if freezing takes place after rigor is over.

The method of packing and freezing has a significant influence on the denaturation of the fish protein. Glazing, air-tight wrapper, and "gel-packing" protect the flesh against denaturation. Experimental data also indicate that fish frozen in contact freezers resist denaturation longer than those frozen in a blast freezer.

The amount of denaturation that takes place during thawing is dependent upon the temperature and duration of the thawing process. A short thawing time at low temperature gives the best results.

This report was translated from the Swedish by Hugo W. Nilson.

2.1471 THE GRANTON TRAWL 9.

Garner, John
World Fishing 6, 66-67 (December 1957)

When the selected fishing ground is reached and a suitable bottom has been sounded, the vessel is stopped and way is taken off with a touch astern on the engines, with the side from which it is intended to fish facing to windward (weather side). This causes the trawler to make leeway, hence this assists with the shooting inasmuch as the trawl is kept off the side of the ship and prevented from going underneath.

The first operation is to heave the doors outboard. The gilson is passed over the supporting bars of the gallows then through the top sheave, and shackled or hooked into the center link between the brackets. The weight is taken until the shoe of the door is just above the rail, manual power is then used against the door pushing outboard and when clear of the side, the door is lowered slightly and the door chain inserted through the brackets and hooked up. This complete, the gilson is released, leaving the door supported by the chain.

The Dan lenos are then heaved up on the gilson by the butterfly, the gilson is surged while the slack on the cable is heaved onto the winch and finally, when the weight on the cable becomes apparent at the Dan leno, the gilson is slacked away. Thus the Dan leno is heaved tight to the top sheave of the gallows.

The derrick gilson heaves over the fore bunt and fore wing, while the after gilson heaves over the after bunt and wing, which leaves the bosom bobbins inboard. Then, taking the direct lead of the fore quarter rope from the wire strop and allowing 2/3 foot of slack rope, temporary turns are taken round the cleat on the winch. The after rope is dealt with in the same way as the fore one, on the midship sheave after the slip has been clipped round the after strop. The fore gilson is then hooked into the fore quarter strop, and is heaved upon until the bobbins are level with the rail. Using shoulder-power against the bobbins, they are lowered over the rail until the weight is taken by the

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Reprinted in part

3.335 PASTEURIZATION AND STORAGE LIFE OF SALMON ROE

Lapshin, I. I. (Sbornik rabot Moskovsogo instituta nor)
Khozyaistva 8, 148-159 (1956)
Food Manufacture 32, 526 (November 1, 1957)

The author determined the effect of degrees of pasteurization upon the chemical properties and microbiological flora of salmon roe after the roe had been stored for various intervals of time.

Experimental.--Lots of salmon roe were packed in 115-gram capacity glass containers under 450 to 500 millimeters of vacuum and heated as follows: Lots 1, 2, and 3 were heated at 60°, 65°, or 70° C. for 60, 120, or 180 minutes, respectively. After 24 hours, each of the three lots were heated at 75° C. for 30 minutes. After a second 24-hour interval, each of the three lots was heated three times at 60° C. for 60 minutes.

Results.--The best results were obtained when the bottled roe was pasteurized at 65° C. for 60 minutes because disintegration of the roe oils and albumens or a change in the pH of the roe did not occur. Pasteurization and storage of the roe at -40° C. increased preservation by 2 times as compared with unpasteurized roe packed in standard containers. Quality remained unchanged. Pasteurization and storage of the roe at -4° C. increased preservation by 1-1/5 times as compared with unpasteurized roe packed in glass containers. With storage at 18° C. pasteurization increased preservation by 6 times regardless of whether the roes were packed in standard containers or in glass containers.

ABSTRACTER: Martin Heerdt

3.2492 THE DIMINISHING OF WEIGHT LOSSES IN FROZEN MEAT DURING STORAGE

Rutov, D.
Proc. 9th International Congress of Refrigeration, Paris, 1955, pp. 4153-4160, 4176-4178
Food Science Abstracts 29, 404 (October 1957)

Evaporation of moisture from the surface layers of frozen foods during frozen storage results in a significant loss in weight and a significant loss in quality. The author has derived mathematical relations that express the intensity of the control of desiccation. These relations were confirmed experimentally at refrigerated warehouses.

The loss of weight from foods, such as meat, in frozen storage depends primarily on the amount of heat that is flowing into the refrigerated room, and on the type of cooling system that is used. Weight losses in frozen meats are four to five times larger during July than they are during January owing to the increase in heat leakage during the summer.

Frozen foods that were stored in rooms equipped with forced-air cooling units lost 60 percent more weight owing to desiccation than foods that were stored in rooms equipped with pipe cooling coils. If the storage room temperature was decreased from -10° C. to -18° C., the amount of weight loss from frozen fish and meat was almost halved provided that the room insulation was sufficient to prevent additional heat leakage owing to the 8° C. increase in temperature differential.

If the heat leakage was reduced by increasing the effectiveness of the room insulation by 2.5 times, the loss of weight in the frozen meat was cut in half. Heat leakage also was effectively reduced by using jacketed cold-storage room walls. Heat leakage was considerably smaller in a four-story cold-storage warehouse than it was in a one-story cold-storage warehouse of similar capacity. To obtain

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ABSTRACTER: Martin Heerdt

3.5 SALTED AND DRIED FISH 5. VARIABLE "PINKING" RATES IN MOIST SALTED FISH

Rowan, M. K. and Dichmont, A. D.
Annual Report, Fishing Industry Research Institute, Cape Town, South Africa 9, 13 (1955-1956)

Studies made with salt fish in 1954-55 showed that (1) the growth of halophilic bacteria and (2) the resulting pink discoloration do not always proceed at the same rate when a single sample of contaminated salt is used with different samples of fish tissue.

Experiment 1.--To further investigate this inconsistency, 20-gram samples of fish tissue were removed aseptically and mixed in a sterile petri dish with an equal weight of contaminated salt. These samples then were incubated in sealed containers at 38° C. over a saturated salt solution containing an excess of salt. Fish tissue samples from 18 fish that had been caught on the previous day and held overnight in ice were salted as described above.

Results.--The shortest incubation period before a pink color developed in this fish tissue was 8 days, whereas the longest incubation period was 20 days. Four of the samples turned pink in 10 days, five in 11 days, three in 12 days, and the remaining four in 13, 15, 17, and 18 days, respectively.

Experiment 2.--Twelve of the fresh fish used as a source of fish tissue in experiment 1 were stored for 8 days in ice. Fresh tissue samples from these stored-in-ice fish were taken at daily intervals and treated with the contaminated test salt as in experiment 1.

Results.--These samples required from 9 to 19 days incubation for the development of a pink

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ABSTRACTER: Martin Heerdt

OPERATING GRANTON TRAWL

REDUCING DRYING DURING FROZEN STORAGE

PASTEURIZATION OF SALMON ROE

PINKING OF SALT FISH

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the minimum amount of loss of weight in frozen foods, the warehouse must be filled to maximum capacity. The absolute annual loss of weight, however, was the same regardless of whether the store was 100, 60, or 40 percent full owing to the limited capacity of the cold coils for the condensation of vapor. For this reason, frozen meat should not be stored in the same room with packaged products. An increase in the humidity of the storage room also decreased the loss of weight in frozen foods.

Equations presented in this paper by the author can be modified to permit calculation of the loss of weight from packaged foods. The loss of weight in frozen meat can be reduced by as much as 90 percent by hermetically packaging the meat in materials having a low water-vapor permeability.

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color. The shortest time interval for pink color development in individual fish occurred in five fish 1 day in ice, in two fish 4 days in ice, and in five fish 8 days in ice. No correlation was apparent between incubation time and the storage age of the fish. The longest and shortest incubation periods with individual fish were almost as great as the incubation period between different fish. In one instance this interval was 9 days, in three instances it was 7 days, and in eight instances it was 5 days.

Experiment 3. -- When experiment 2 was repeated with the remaining six fish and a different sample of contaminated salt, incubation periods leading to pink color formation ranged from 16 to 21 days in fish that had been held in ice for 3 to 8 days.

Experiment 4. -- Duplicate samples were obtained from the six fish used in experiment 3 on four different occasions during storage in ice. The first sample was treated in the ordinary way, whereas the second sample was salted down in a petri dish that contained a pad of sterile filter paper. This pad absorbed liquid drawn from the fish during salting. The average length of the incubation period until the development of pink color was considerably reduced in samples of salted fish held on pads.

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quarter ropes. When the mate has assured himself that the crew are well clear of the bights of the quarter ropes, the order is given to "Let go."

The trawl is now ready for lowering. Both brakes are released and the Dan lenos lowered until the figure-of-8 link jams in the Kelly's eye. The doors are then clipped up, followed by the winch being "shipped-up" (ship the clutch) and the weight taken on each door to allow the chain to be released.

The doors are held while the skipper brings the vessel hard round to the side to be worked, at half speed, for the purpose of spreading the gear. When this has been achieved, the vessel is stopped once more and the doors are lowered (the fore door is lowered, keeping the strain on the brake, whereas the after door is lowered smartly to prevent the warp from going underneath the propeller, after which the strain is maintained), until the first mark on the fore warp is between the center bollard and the fore gallow, and the after warp is level with the winch at the side of the vessel.

The warps are held in position while the vessel starts to come round at full speed with the helm still hard over onto her intended course. About two points from this course-line the wheel is put amidships (this varies slightly with different ships) and as the vessel straightens up the after warp will close alongside, and, if judged correctly, should just touch the ship's side as the intended course comes into line on the compass. The skipper then gives the order to "slack away," also stating the number of lengths he wishes to be lowered. (Three times the depth of water, plus one extra length for luck, is the amount of warp usually allowed for a towing. Thus, if fishing at a depth of 50 fathoms, 7 lengths would be lowered, that is 175 fathoms.) The skipper's whole attention is then concentrated in keeping the vessel on a straight course. When the required number of lengths have been "payed away" the messenger hook is placed over the fore warp, while the skipper brings the gear slightly off the side. Finally the warps are heaved up to the stern of the vessel where they are blocked. The vessel is then slackened down to towing speed.

It is often advisable, if fishing in very deep water, to let the vessel trawl at slow speed for a short while after shooting, to allow the gear to settle on the bottom.

3.335

2.3 HANDLING AND PREPARATION OF FISHERIES PRODUCTS - MACHINES

Anonymous
La peche maritime, la peche fluviale et la pisciculture 35, p. 497 (November 1956)
World Fisheries Abstracts 8, 19-20 (November-December 1957)

The cutting of cod fish needs much space and manual work aboard. For fresh or salted cod, 2 stages are used: in the 1st, the head is removed with a special knife, and care is taken to save as much flesh as possible, then the belly is cut for gutting. The 2nd consists of cutting the muscle parallel to the backbone up to the back part of the anal fin. A 2-man team can handle 20 to 25 fish/min. When the hauls are good, the whole crew has to work on it and the next launching of the trawl is delayed. It is, therefore, profitable to mechanize this operation. Studies on cod showed that the viscera are hung in the belly cavity at 2 points: close to the head and near the vent. On the trawler Dnieper, this improved the hand-cutting and thence a method for mechanical cutting was elaborated. The cutting machine is like a drilling machine in which the drill is replaced by a circular knife (see over). The 1st machine, fitted with a small diam. knife cuts around the vent; a 2nd machine, with a great diam. knife, cuts the head and the nearby connections with the viscera. The viscera are then easily removed. With such machines, a 4-man team can complete the whole work from picking the fish up on the deck to sorting the livers. The fish are washed and stowed into a refrigerated hold kept at 7° C. (44.6° F.) with 40% ice. They are placed backs upwards to avoid accumulation of water in the belly cavity. This cutting method has been recommended by the Direction Board of Fisheries of Murmansk, U.S.S.R. Fish treated in such a way can be salted or smoked. Trials with hot smoking were completed under different conditions: (i) belly cut, black skin and air bladder removed; (ii) belly uncut; (iii) as (ii) but fish sliced into thick steaks. Tests have shown that hot smoking without cutting the belly gave a better taste for a cheaper cost.
See illustration, over.

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ABSTRACTER: Jacques Chaux

4.11 ATHEROSCLEROSIS BREAKTHROUGH

Anonymous
Chemical and Engineering News 36, 48 (February 3, 1958)

Advances in gas chromatography have led to quick separation of oleic, linoleic, and linolenic acids--biologically important C_{18} unsaturated fatty acids--from complex lipids. Many scientists now believe that these three fatty acids, along with arachidonic acid, may be keys to questions on fat metabolism in humans and perhaps also to those on atherosclerosis.

With industry growing more aware of the problems of fats and metabolism, in May of 1957 the Committee on Problems of Lipid Analysis was formed, with E. C. Horning of the National Heart Institute as chairman. The greatest problem of the committee was to find a fast and reliable method for analysis of fats and fatty acids through at least C_{22}.

S. R. Lipsky of the Department of Internal Medicine of Yale Medical School soon developed gas chromatographic equipment and techniques for fatty acids to equal those of the British. Lipsky and his group developed a custom-built gas chromatograph readily used for separating microquantities of long-chain fatty acids.

The critical C_{18} unsaturated group, however, remained elusive. Since the liquid phases being used did not give separations in the desired range, new liquid phases were screened with the result that a polymer--Reoplex 400, a polyester--was found. At about this same time, Lipsky found two other partition agents that would separate unsaturated acids: (1) LAC-1-R 296, the adipate polyester of diethylene glycol and (2) LAC-2-R 446, adipate polyesters of diethylene glycol partially cross-linked with pentaerythritol. These new liquid phases in the new instruments gave good,

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ABSTRACTER: June H. Olden

4.11 SEPARATION OF POLYUNSATURATED FATTY ACID METHYL ESTERS BY GAS CHROMATOGRAPHY

Orr, C. H. and Callen, J. E. (Procter & Gamble Company, Cincinnati 31, Ohio)
Journal of the American Chemical Society 80, 249 (January 5, 1958)

Introduction.--Fat nutrition and metabolic process studies involving fats are dependent upon methods for separating methyl esters of high molecular weight fatty acids. In the following studies, methyl oleate was separated from methyl stearate, and methyl oleate was partially separated from methyl linoleate by gas chromatography at 197° to 256° C., with Apiezon M or L vacuum grease as the partition medium. Retention times under conditions optimum for good resolution were of the order of 2 to 3 hours for the C_{18} fraction. Complete separations were made of the methyl esters of palmitic, palmitoleic, stearic, oleic, linoleic, linolenic, arachidic, and erucic acids including polyunsaturated materials. The time required for analysis was shortened by gas chromatography from 2 hours in a previous study to 27 minutes in this study as evidenced by the emergence time.

Experimental.--For a chromatographic column, the authors used a ¼-inch outside diameter, copper tube that was 12 feet in length and was packed with 23.1 grams of 30 percent Reoplex 400 Plasticizer on Johns-Manville Celite 545 (80-100 mesh). For an indicator, the column was equipped with a Gow-Mac Filament Thermal Conductivity Cell (Model 9285--Pretzel geometry). Gas flow was maintained at 75 milliliters (ml.) of helium per minute, as measured at room temperature at the column exit. The column and cell temperatures were 240° C. with a pressure drop of 30 pounds per square inch across the column. Ten microliters of sample was used for each compound studied.

Results.--The fatty acid esters in each carbon number class emerged from the column at intervals of time that increased with the number of double bonds in the compound. This is a reverse

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ABSTRACTER: Martin Heerdt

6.132 FISH MEAL 7. PRELIMINARY COMPARISON OF VARIOUS COOKER-PRESS COMBINATIONS

Dreosti, G. M. and Stander, G. H.
Annual Report, Fishing Industry Research Institute, Cape Town, South Africa 9, 25 (1955-1956)

Purpose.--The quality of press cake made by three different cooker-press methods was compared.

Experimental.--Press cake by method 1 was prepared in a 20-ton indirect cooker and a 20-ton twin screw press. Fish was fed at the rate of 18 tons per hour and cooked in three stages for 13 minutes under a steam pressure of 30 pounds per square inch in stage 1, 30 pounds in stage 2, and 15 pounds in stage 3. Cooker shaft pressure was held at 20 pounds per square inch.

Press cake by method 2, was prepared in a 20-ton indirect cooker and a wheel press. Fish was fed at the rate of 14 tons per hour and cooked for 25 minutes under a steam pressure of 20 pounds per square inch.

Press cake by method 3, was prepared in a 10-ton direct steam cooker and a wheel press. Fish was fed at the rate of 7 tons per hour and cooked for 20 minutes under a steam pressure of 5 pounds per square inch measured at the semi-valve end, and 4 pounds per square inch measured at the force feed end.

Samples.--Samples of press cake prepared by methods 1, 2, and 3 were obtained at half hour intervals, blended to make each sample uniform, and reduced by quartering and coning to samples

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ABSTRACTER: Martin Heerdt

DRESSING COD

SEPARATION OF FATTY ACID ESTERS

FATTY ACID SEPARATION

COMPARISON OF COOKER-PRESS METHODS

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order of emergence compared with the order obtained with Apiezon L and other non-polar partition media. Data obtained thus far in terms of V'r values calculated at a flow rate of 75 ml. per minute under conditions in which the V'r for air is 94 ml. show retention volumes in milliliters as follows: methyl caprylate 140, methyl caprate 245, methyl laurate 420, methyl myristate 710, methyl palmitate 1220, methyl palmitoleate 1340, methyl stearate 2000, methyl oleate 2180, methyl linoleate 2520, methyl linolenate 3040, methyl arachidate 3400, and methyl erucate 6000.

Work in progress indicates that further improvements in resolution are possible and that retention times can be reduced further without harming the resolution. If the logarithm of the retention values is plotted against the number of carbon atoms in the fatty acid chain or the number of double bonds in the fatty acid chain of a given length, straight lines are obtained that allow for the prediction of the approximate retention volumes of some of the less abundant fatty esters. Examples of these are methyl arachidonate (methyl eicosatetraenoate) and methyl eicosapentaenoate.

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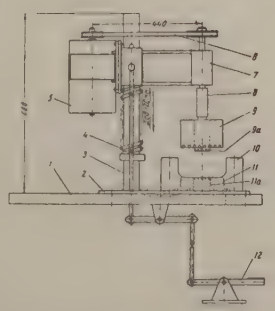
of a size suitable for analysis.

Results. -- The relative performance obtained with the various cooker-press methods did not follow a regular pattern. With firm to soft fish having 7.3 percent fat, method 3 produced a press cake having 49.5 percent moisture and 8.83 percent fat; whereas with firm fish containing 4.7 percent fat, method 3 produced a press cake having 53 to 55 percent moisture and 8.02 percent fat. With slightly soft fish having 3.4 percent fat, method 1 produced presscake having 45.7 percent moisture and 7.28 percent fat; whereas with soft fish having 6.7 percent fat, method 1 produced a press cake having 48.4 percent moisture and 9.94 percent fat.

Method 2, on the average produced a press cake with 46.5 percent moisture, whereas methods 1 and 3 produced press cakes with moisture contents of 48.2 and 51.7 percent, respectively. Method 2 produced a meal with an average of 7.76 percent fat (dry basis), whereas methods 1 and 3 produced meals with averages of 8.81 and 8.25 percent fat (dry basis), respectively. Method 1 processed raw fish at a greater rate of feed intake than either methods 2 or 3.

Conclusions. -- The only conclusion reached by all of the comparisons is that method 3 produced a wetter press cake than either methods 1 or 2. Further tests are planned.

2.3



The machine for cutting cod heads and the part around the vent.

1. Cutting table
2. Set plate
3. Frame
4. Spring
5. Electric motor
6. Belt
7. Guide
8. Shaft
9. & 9a. removable circular knives
10. Support for the cod fish
11. & 11a. set knives
12. Pedal

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quantitative separation of oleic, linoleic, and linolenic acids.

As results of experimental work with the use of thermal-conductivity type detectors showed that much greater sensitivity was desirable, plans now call for tests with new sensing systems such as beta ionization, with krypton-85 as a source, and gas-type detectors.

3.10 SALT

Freixo, J.
Conservas de Peixe 10, p. 23 (February 1956) (Lisbon, Portugal)
World Fisheries Abstracts 8, 37-38 (September-October 1957)

In several countries tests have been carried out to destroy or inhibit the development of red halophilic bacteria in marine salt. Among the different methods used were the following:

Action of ozone. --Samples of salt were subjected to the effect of ozone as follows: (1) exposed to ozone for 4 hrs. at room temperature in an atmosphere of 60 to 65% relative humidity (R. H.); (2) subjected to action of ozone for 2 hrs. at 70° C. (158° F.) in an atmosphere of 80% R. H.; (3) exposed to ozonized air for 2 hrs. at 70° C. with 85% R. H. The growth of cultures in fish broth with rice flour have shown that the ozone in dry air at room temperature produces only a slight effect as compared with untreated salt with ozone. The ozone has a more noticeable effect with the increase of the relative humidity. At 80% R. H., the red halophilic bacteria were killed. Temperatures of 80° C. (176° F.) in ozonized air also sterilized the contaminated salt.

Action of the "B. T. C.". --(The formula of this is not given) red halophilic bacteria grew well in a culture media treated for 15 min. with a "B. T. C." solution (3.3 g. in 1 l. of water) after 2 to 3 weeks in an incubator at 37° C. (98.6° F.). However, cultures treated for 1½ hrs. with the same solution did not show any development.

Action of wet heat under pressure. --Two test tubes with cultures of red halophilic bacteria were placed in an autoclave and kept at 110° C. (230° F.) for about 20 min. No development of bacteria was noticed when cultured at 37° C.

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ABSTRACTER: Francisco Hoyos

6.19 FISH MEAL 17. THE BIOLOGICAL EVALUATION OF SOUTH AFRICAN FISH MEALS

Willmer, J. S.
Annual Report, Fishing Industry Research Institute, Cape Town, South Africa 9, 31-32 (1955-1956)

Samples of raw pilchards, their resultant press cakes, and their resultant meals were obtained in a study of the effects of various processing conditions on the biological value of South African fish meals. Included in this study were raw pilchards that contained very little offal as obtained from canning plants. The major difference in the reduction processes studied was in the type of dryer employed for drying the press cake. Press cakes were dried in oil-fired hot air driers, coal-fired hot air driers, steam-tube driers, and air-lift driers. Samples of press cake and meal were obtained from the same initial batch of pilchards by using a marker dye to time the cooking and drying stages. All biological values were determined in duplicate by the method of Miller and Bender.

Results. --The biological values of fish meals produced from oil- or coal-fired driers appeared to be significantly higher than those obtained from steam-tube driers. The probable reason for the high values is that exposure to elevated drying temperatures was for a shorter time in the coal- and oil-fired driers than in the steam-tube drier. Results obtained in this study are tabulated (see over).

Conclusions. -- From a nutritive standpoint it appears preferable to dry fish-meal press cake for a short time at a high temperature than for a long time at a low temperature.

See table, over.

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ABSTRACTER: Martin Heerdt

6.14 FISH MEAL 11. SPONTANEOUS HEATING OF FISH MEAL

Dreosti, G. M.; Rowan, A. N.; and Lewis, A. M.
Annual Report, Fishing Industry Research Institute, Cape Town, South Africa 9, 27-28 (1955-1956)

Purpose. --This study was made to investigate the spontaneous heating of fish meal. Adiabatic calorimeters were used to measure the heat produced by fish meal under controlled conditions.

Experimental. -- An adiabatic calorimeter was designed by the Fishing Industry Research Institute for this study. The calorimeter is in essence a watertight five-pound capacity fish meal container through which oxygen, nitrogen, and air can be passed at controlled rates. This container is submerged in a tank of water held at 0.1° to 0.2° F. below the temperature of the meal and kept in constant motion by a stirring device. The temperature of the water in this tank is controlled to follow the temperature of the meal. These conditions keep the loss of heat from the meal at a minimum and permit the amount of heat generated by the meal to be measured by its rise in temperature. If the rate of heat generation at room temperature is slow, particularly with older meals, preheaters are used to bring the meal to 110° or 120° F. At this temperature level the rate of rise in the temperature of the meal usually is reasonably fast. The internal preheater consists of a length of cylindrically wound resistance wire around a former.

Results of preliminary tests. -- Thermocouples and a recording resistance thermometer showed that the results obtained with the calorimeter were reproducible. Three successive samples of well mixed meal showed that the rates of heating of the meals were 0.700° F., 0.732° F., and 0.705° F. per hour at 125° F. The heating curve in a number of one-month old fish meals followed a single pattern with the rate of heating increasing steadily as the temperature of the meal increased. The highest temperature to which any fish meal was taken in the calorimeter was 178° F. At this temperature the rate of heating was still increasing. The relationship between the rate of heating and the

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ABSTRACTER: Martin Heerdt

6.193 NORTH DAKOTA TESTS SUBSTITUTION FOR FISH MEAL IN TURKEY DIET

Anonymous
Feedstuffs 30, 61 (January 25, 1958)

This article is based on a report of turkey diets by William C. Lockhart, Reece L. Bryant, and D. W. Bolin, of North Dakota Agricultural College.

Purpose. --In this study the authors set up a series of feeding trials with young Broad Breasted Bronze and Broad White turkeys. The objectives of these feeding trials were (1) to learn if locally made meat meal that had been supplemented with growth-promoting factors could be fed in place of fish meal, (2) to reduce the cost of the starting diet, and (3) to obtain information on which to base further experimental work. Meat meal has been reported by other workers to contain the fish factor found in dried fish solubles.

Results. --The experimental results obtained in this study indicated that the meat meals in general are much too low in the fish factor to support optimum growth and feed efficiency. A high level corn- and soybean-meal basal diet supplemented with 3 percent meat meal and 2 percent dried fish solubles gave a growth and feed efficiency that was equal to the growth and feed efficiency obtained by supplementation of the basal diet with 3 percent fish meal. A saving of 2 dollars per ton of feed was made by replacing the 3 percent fish-meal supplement with meat meal and fish solubles. This saving is based on conditions in North Dakota.

To obtain a growth and feed efficiency equal to that obtained with 3 percent fish meal as a supplement to the basal diet, a high quality meat meal is necessary. Meat meals containing

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ABSTRACTER: Martin Heerdt

RED BACTERIA IN SALT

HEATING OF FISH MEAL

EVALUATION OF MEAL DRYERS

SUPPLEMENTATION OF MEAT MEAL WITH FISH

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temperature of the meal is not logarithmic because it rises more slowly at higher temperatures than would be the case if a logarithmic relationship existed.

The rate of heating at any one temperature appeared to be very high in fresh meals. One 24-hour-old bagged meal had a rate of heating of 5° F. per hour at 125° F. From unconfirmed tests it appears that the rate of heating of fish meal at 125° F. falls rapidly in the first few weeks from 5° F. in 24 hours to about 0.8° F. after a month and then decreases slowly thereafter.

One fish meal that received successive tests for heating in the calorimeter showed a constant decrease in the percentage of fat after each test as determined by hexane extraction. In addition, a straight line relationship was found between the total temperature rise (for all successive tests added together) and the amount of fat in these meals. For the first 50° F. rise in temperature, the decrease in fat per degree F. was 0.0240 percent. For the next 17.5° F. rise in temperature, the decrease in fat was 0.0229 percent. For the final 21° F. rise in temperature the decrease in fat was 0.0238 percent. In similar tests on a number of meals the decrease in fat per degree F. rise was found to vary between 0.005 and 0.93 percent per degree F. In the range 110° to 140° F., the rate of heating doubled when the temperature increased by 10° to 22° F.

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noticeable quantities of hair and bone do not meet these quality requirements.

Further results. -- Two of the fish meals used in one of the turkey feeding trials gave better growth responses when supplemented with dried fish solubles. Supplementation of the fish meals with dried fish solubles, however, did not change the efficiency of feed utilization. Dried fish solubles fed at the 4 percent level as a supplement to the basal corn- and soybean-meal diet appeared to support growth and feed efficiency that were equal to either 3 percent meat meal or 3 percent fish meal when both of these meals were supplemented with 2 percent dried fish solubles.

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Effect of boiling water. -- Cultures of red halophilic bacteria treated with boiling water for 2 min. do not develop in an incubator at 37° C. With temperatures below 8° C. (46.4° F.), development of halophilic bacteria is very small; between 13° and 20° C. (55.4° and 68° F.), it is slow and the optimum temperature is 42° C. (107.6° F.). The incubation period fluctuates from 1 to 5 weeks and and the color of the colonies is from pink to red. Heating of samples of salt at 80°, 100° and 180° C. (176°, 212° and 356° F.) was also tried. The first of these temperatures was insufficient to sterilize the product.

Effect of sulphurous acid. --The experiments show that: (1) the cultures made with marine salt and 2% sodium metabisulphite did not show halophilic microorganisms; (2) the use of 4% sodium metabisulphite solutions on cultures of red halophilic bacteria produced a progressive discoloration and the absence of color after 6 days; (3) decolorized colonies of bacteria were transferred to test tubes and petri dishes and incubated at 37° C., but the color did not reappear.

Effect of the action of solar rays. -- Samples were kept for 18 months in an open jar exposed to sunlight, but protected from the rain. The cultures showed that after 6 days of exposure the pigmentation persisted although less colored. When taken again to the incubator, the color turned more intense.

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Factory	Type of fish meal drier		Raw pilchards	Press cake	Fish meal
A	Oil-fired hot air rotary drier	Net protein utilization	56.3	61.3	73.1
		Digestibility	89.7	86.8	85.2
		Biological value	62.8	70.6	85.8
B	Steam tube Rotary drum	N.P.U.	50.5	61.3	64.5
		D.	87.8	84.1	86.9
		B.V.	57.5	72.9	74.2
C	Steam tube Rotary drum	N.P.U.	53.5	64.7	63.5
		D.	84.6	86.9	84.8
		B.V.	63.2	74.4	74.9
D	Oil-fired hot air lift	N.P.U.	57.8	62.5	70.4
		D.	88.2	88.5	85.8
		B.V.	65.5	70.6	82.0
E	Oil-fired hot air lift	N.P.U.	63.3	65.6	--
		D.	87.2	85.9	--
		B.V.	72.6	76.4	--
F	Coal-fired hot air rotary drum	N.P.U.	56.1	59.1	69.5
		D.	88.5	85.9	86.8
		B.V.	63.4	68.8	80.1

3.338 MOISTURE CONDENSATION AND COLD-STORED MILITARY RATIONS

Heaton, E. K. and Woodroof, J. G. (Georgia Experiment Station, Experiment, Georgia)
Food Technology 12, 24-29 (January 1958)

From these experiments it appears that moisture condensation or "sweating" may occur on military rations at any time they are exposed to a warmer temperature; i.e., removal from storage to a humid, warmer atmosphere; or upon sudden admission of warm, humid air to the holding spaces. However, the usual ill effects associated with moisture condensation have not been found to be of major importance in refrigerated storage of assembled Combat Rations. The selection and use of good packaging materials are the reasons for this good response.

Under prevailing practices, condensation is related to one or more of the following: the nature of the items, the type of package, storage conditions before assembling, and the conditions for assembling, storing and warming-up.

Moisture condensation was found to be associated with the density, heat capacity and heat conductivity of the product. It was worst on such products as canned apricots, corn, meat balls and spaghetti, and was least on canned soluble coffee, dry cream and cookies. In general, products with the highest water content, or with the heaviest syrups, had the most condensation.

Moisture condensation was more abundant and caused greater damage to tin cans than to any other packaging material. Some condensation formed on the outside of cases, on pads and dividers, and on flexible packets, but soon evaporated with little or no ill effects. Damage to the cases was confined largely to the metal straps and staples.

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Authors' summary

6.54 THE PRODUCTION OF EDIBLE FISH PROTEIN (FISH FLOUR) FROM COD AND HADDOCK

Guttmann, A. and Vandenheuvel, F. A. (Fisheries Technological Station, Halifax, Nova Scotia)
Fisheries Research Board of Canada, Progress Reports of the Atlantic Coast Stations No. 67, 29-31 (November 1957)

Introduction.--Recent studies indicate that even in Canada and the United States a need exists for additional protein in the diets of postoperative patients, elderly people, and people engaged in heavy manual labor. For these reasons, the manufacture of a concentrated, low price, wholesome animal protein should be economically sound even in the United States and Canada. In other countries, casein as well as fish protein has been added to flour used in making bread. This method appears to be a very simple way of increasing the daily intake of animal protein.

Process of manufacture.--The process used at the Halifax Technological Station is as follows: Washed, fresh fillet waste, without heads, from fish such as cod, haddock, and hake was heated with dilute acid and then washed and pressed. The resulting press cake was extracted with solvent. An almost white, odorless and tasteless, flour-like product was obtained. Byproducts recovered during the manufacture of fish flour were: (1) a soup extract that was obtained from the acid washings and (2) skins and bones that were separated from the fish tissue at an early stage in the process. Yields obtained on the basis of 100 pounds of fillet waste without heads averaged 10.0 percent protein flour, 5.2 percent bone meal and skin, and 3.7 percent solids from acid washings. The protein fish flour obtained was grayish-white to white in color and practically odorless and tasteless. Additional tastes and flavors did not develop in the flour on prolonged storage.

Flour composition.--The flour contained 2 to 3 percent moisture, 2 to 5 percent ash (mostly

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ABSTRACTER: Martin Heerdt

6.35 A SURVEY OF IRISH MOSS ON GRAND MANAN IN 1955

Taylor, A. R. A. (Fisheries Biological Station, St. Andrews, New Brunswick)
Fisheries Research Board of Canada, Progress Reports of the Atlantic Coast Stations No. 67, 3-5 (November 1957)

Survey.--The Irish moss resources on Grand Manan Island, New Brunswick, were surveyed during the summer of 1954 by the New Brunswick Department of Industry and Development. Small restricted areas of Irish moss (Chondrus crispus) and large areas of false Irish moss (Gigartina stellata) were located. False Irish moss yields products similar in nature to those obtained from true Irish moss. The false Irish moss on Grand Manan Island was located in very exposed places and was mixed with other seaweeds so that a satisfactory harvest did not seem possible.

Quality of the moss.--Extracts of Irish moss yield carrageenin, which, for example, keeps the chocolate in chocolate milk from settling out. The value of carrageenin extract depends upon its yield, its jellying properties, its suspending powers, and its viscosity. Extracts from sample lots of both true and false Irish moss were analyzed by the Atlantic Provinces Regional Laboratory of the National Research Council. True Irish moss from Ross Island contained 31 percent carrageenin, which is a good yield. This carrageenin had a gel strength of 220 grams and a viscosity of 3.4 centipoises. False Irish moss from Deep Cove contained 11 percent carrageenin with a gel strength of 60 grams and a viscosity of 3.4 centipoises.

Findings.--The survey disclosed the following information: (1) Chondrus crispus occurs in small areas along the northeast part of Grand Manan Island. These small areas produce large clumps of good quality seaweed in tide pools and short, poor-quality seaweed badly covered with mussels in the open sea. The tide pool clumps were abundant in small areas yet insufficient for continuous harvesting. (2) An extensive growth of Gigartina stellata mixed with other seaweeds occurs at and near the low tide level of the rocks and ledges around "Three Islands" and other offshore islands. (3) An

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ABSTRACTER: Martin Heerdt

6.55 FISH VISCERAL FLOUR REPORTED SATISFACTORY AS SWINE SUPPLEMENT

Anonymous
Feedstuffs 30, 105 (February 22, 1958)

Fish flour made from viscera is a new product of the Canadian fishing industry. In recent tests, this flour proved to be a satisfactory protein supplement for use in the rations of hogs during both their growth and their fattening periods. These studies were made by the Canadian Department of Agriculture on an experimental farm located at Nappan, Nova Scotia. Hogs used in the test exhibited no objections to eating fish flour in their rations and showed satisfactory rates of gain, feed efficiency, and carcass grade.

Feeding study.--Rations used in the studies contained barley, oats, minerals, and fish flour added at the rate of 10 percent by weight of the grain in the ration. Hogs received this ration from weaning until they reached a live weight of 100 pounds. At this stage in their growth the level of fish flour was reduced to 4 percent of the grain mixture and held at this level until the hogs reached a market weight of 200 pounds.

Process of manufacture.--The fish flour is made from the fresh viscera of cod and haddock collected on board ship, preserved with sodium nitrate, and held at 80° to 100° F. for several days. During this period of holding or digestion, most of the solids become liquids. These liquids are then drum dried and ground into flour. The fish flours fed on the experimental farm at Nappan, Nova Scotia, were made experimentally at the Fisheries Technological Station, Halifax, Nova Scotia.

At present about 90 million pounds of fish viscera are discarded annually in the Atlantic fishing

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ABSTRACTER: Martin Heerdt

CONDENSATION ON CANNED FOODS

IRISH MOSS ON GRAND MANAN

EDIBLE FISH FLOUR

VALUE OF FISH FLOUR FROM VISCERA

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extensive growth of Gigartina stellata occurs on the exposed rocky, southern shores of Grand Manan Island. Gigartina stellata was very good and easily available in some areas and sparse or heavily overgrown with seaweeds in other areas.

Conclusions.--It appears doubtful that Grand Manan Island could support a fishery for Irish moss, however, Irish moss might be profitably harvested in some areas if the larger seaweeds of little value are removed to allow for better growth as well as easier harvesting of Gigartina stellata. Experimental plots stripped of the larger valueless seaweeds were laid out.

Map of Grand Manan, N. B., showing areas surveyed for Irish moss, Chondrus crispus, and false Irish moss, Gigartina stellata (June 1954 and August 1955). Dots inside the shoreline indicate where neither species was found; dots outside the shoreline indicate one or other present in some quantity. Solid circles show areas where Chondrus was present in satisfactory condition; half-solid circles indicate Chondrus present but unsatisfactory in condition and amount. The solid triangles indicate substantial areas of Gigartina.

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areas off the shores of Canada. This amount of viscera would yield about 18 million pounds of fish flour annually.

Further studies are planned.

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It was found extremely important to store products in tin cans free of rust--either surface or pitted rust. Rust, once initiated, increased during the periods of assembly, storage and warming-up. Initiation of rust was related to imperfections in the cans, mechanical injury to the cans, presence of corrosive substances and hygroscopic materials on the cans, as well as to moisture condensation.

Rations destined for refrigerated storage should be especially selected and handled--that is, the cans should be free of rust, scratches, or other damages and other package materials should be as moisture impermeable as is practical. Rations may be assembled before or after storage, but, on the basis of the findings, preferably the latter. They should be handled during prestorage under conditions where fluctuation in temperature and humidities is as small as possible. Rations should be stored at suitable temperatures and at low humidities, with only slight variation in either. Finally, they must be allowed to reach room temperature before opening.

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calcium phosphate), negligible amounts of lipids, and 94 to 98 percent protein on a dry, ash-free basis. Analyses based on ion exchange chromatography showed the following percentages of amino acids: α-alanine 5.90, arginine 7.61, aspartic acid 10.83, glutamic acid 15.12, glycine 3.79, histidine 2.22, isoleucine 4.57, leucine 9.08, tryptophan 1.4, lysine 11.48, methionine 3.09, phenylalanine 4.32, proline 2.85, serine 4.65, threonine 4.57, tyrosine 3.96, and valine 3.79.

Acid treatment of offal.--Suspend the ground offal in water adjusted to pH 5.5 with polyphosphoric acid and heat to 166° to 173° F. Stir and hold at this temperature for 13 minutes. Filter the mixture, and crush the filter cake. Wash with a small amount of hot water, and filter. Combine the filtrate and first washings and save for preparation of a soup extract. Wash the cake with additional hot water until a nearly colorless filtrate is obtained. Discard these washings. One hundred parts of ground offal will yield 43 parts of press cake having 56 percent water.

Isopropanol extraction of press cake.--Suspend the press cake in twice its volume of isopropyl alcohol. Extract by refluxing for 15 minutes, and filter hot. Save the filtrate from this extraction. Extract small amounts of residual fat and water by washing the filter cake with twice its volume of isopropyl alcohol. Save the filtrate from this extraction. Screen the cake to remove the coarser particles of skin and bone. These particles account for about 35 percent of the original dry material in the offal. Dry and grind the remaining press cake solids. Remove the last traces of isopropyl alcohol under reduced pressure. Ten parts of finished fish flour will be obtained from 100 parts of original offal.

Solvent recovery.--Distill the isopropyl alcohol filtrate saved from the first extraction; and collect the distillate, which consists of recovered isopropyl alcohol containing 13 to 14 percent water. Use this distillate as a hot wash for the filter cake obtained from the first extraction and filtration. Distill the isopropyl alcohol filtrate saved from the second extraction, and collect the distillate. Use this distillate as a medium in which to reflux the original press cake from another batch of fish offal.

8.199 FEEDING AND FEEDING STUFFS -- OFF-TASTES IN LIVESTOCK PRODUCTS

Dunn, J. S.
Memorandum No. 79 (Fishing Industry Research Institute, Cape Town, South Africa) 14 pp. (1956)
World Fisheries Abstracts 8, 37-38 (November-December 1957)

This memorandum is a survey of the literature dealing with the development of fish flavors in various foods, particularly poultry and pig products, due to the feeding of fish meals or fish oils in the ration. There is a great diversity of opinion as to whether feeding fish products do or do not cause fishiness in foods. After quoting the evidence of a number of authorities, which is then summarized in the form of tables, the memorandum gives the conclusions arrived at.

Poultry and eggs. -- Despite a certain amount of contradiction, it appears very difficult to produce fishy flavors in the flesh of poultry or ducklings by feeding fish meals, even fish meals from fatty fish such as menhaden or pilchard. With the levels usually fed in the ration, the danger seems negligible. At the same time, it is considered prudent to take the fowls off fish meal for at least 2 weeks prior to slaughter. With fish oils it is another story; cod liver oil, menhaden and other fish oils produce fishy flavors in the flesh when at levels of 1 percent or more, and rancidity in the oil is liable to enhance the effect. All fish oils, however, do not behave in the same way, and red fish oil seems to be less dangerous than the others. It seems practically impossible to produce fishy flavored eggs by feeding either fish meals or oils. Fishy eggs are considered to be due to some individual idiosyncracy in the hen rather than to anything in the diet, and fishy eggs can be laid by hens not being fed any fish products. The remedy seems to be to cull the fishy egg layers from the flock. Several authorities, however, emphasize the fact that eggs are prone to pick up fishy taint if collected in containers that have been used for fish meals or oils, are soiled with such materials, or even kept in rooms where such materials are stored.

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Author's summary

7.879 2-THIOBARBITURIC ACID METHOD FOR THE MEASUREMENT OF RANCIDITY IN FISHERY PRODUCTS. II. THE QUANTITATIVE DETERMINATION OF MALONALDEHYDE

Sinnhuber, Russell O. and Yu, T. C. (Oregon Agricultural Experiment Station, Astoria, Oregon)
Food Technology 12, 9-12 (January 1958)

Introduction. --Oxidative rancidity in foods that contain fat leads to the formation of malonaldehyde or derivatives of this compound. The red product that is formed by the reaction of malonaldehyde with 2-thiobarbituric acid (TBA) affords an effective means of measuring the extent of autooxidation that has occurred. TBA procedures described by the authors in 1957 were useful for studying the development of oxidative rancidity on an empirical basis.

Purpose. --The present paper proposes a quantitative method for determining malonaldehyde, but it does not definitely establish that free malonaldehyde exists in rancid fish products.

Experimental. -- A stable compound 1, 1, 3, 3-tetraethoxypropane (TEP) is used as a standard. Acid hydrolysis of TEP yields malonaldehyde, which reacts with TBA, under the conditions described, to give a quantitiative method for the measurement of malonaldehyde. This study presents the reaction time, total reactivity, and spectral characteristics of the reaction compound. The sensitivity of the method is 10^{-8} moles of malonaldehyde per 100 milliliters of solution. The authors suggest the term, TBA number or milligrams of malonaldehyde per 1000 grams of product material as a measure of oxidative rancidity.

Study. --The proposed TBA method was used to follow (1) the auto-oxidation that occurs in frozen tuna scrap from tuna canneries and (2) the effect of the antioxidants N, N'-diphenyl-p-phenylenediamine (DPPD) and Tenox IV in preventing oxidative rancidity in frozen tuna scrap. Scrap fish

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ABSTRACTER: Martin Heerdt

7.81 TRIMETHYLAMINE TEST FOR EVALUATING THE QUALITY OF ROSEFISH FILLETS

Dussault, H. P. (Fisheries Technological Station, Grande-Riviere, Quebec)
Fisheries Research Board of Canada, Progress Reports of the Atlantic Coast Stations No. 67, 23-25 (November 1957)

Quality grades for Atlantic Coast rosefish (Sebastes marinus) that are marketed as Ocean Perch have been a problem to producers as well as to fishery inspectors. The first evidence of difficulty occurred some time ago when lots of rosefish fillets that showed a trimethylamine value above the limit allowed for marketability were labeled as unfit for human consumption. After these samples of rosefish fillets had been cooked, however, a group of observers found that they were still acceptable to taste although not completely fresh. Trimethylamine (TMA), a substance that partially is responsible for the fishy odor of spoiled sea fish, has been widely used as an index of fish quality. In some cases the TMA value of fish has not given an indication of its true edibility. This is the case with "bilgy fish" in which spoilage occurs without the production of TMA and with spoiled dogfish in which the alkalinity of the flesh does not permit the production of TMA beyond a low level. In some instances, TMA values are higher for cod than for haddock of comparable freshness when both are evaluated by taste and odor.

Purpose. --This study reports on primary experiments that were made to determine if TMA is a reliable index of the freshness and quality of rosefish fillets and to learn if a grade system can be established using limits similar to those used for fresh and frozen cod fillets.

Experimental. --Four lots of commercially prepared and frozen rosefish fillets were obtained locally, thawed at 60° F., and stored at 38° F. The storage temperature of 38° F. was selected to allow for moderate and gradual spoilage that could be evaluated by taste, odor, appearance, and chemical tests over a relatively short period of time. Samples from each lot were analyzed at the end

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ABSTRACTER: Martin Heerdt

7.89 NEMATODES IN THE FILLETS OF COD AND OTHER FISHES IN IN NEWFOUNDLAND AND NEIGHBORING AREAS

Templeman, Wilfred; Squires, H. J.; and Fleming, A. M. (Fisheries Biological Station, St. John's, Newfoundland)
Journal of the Fisheries Research Board of Canada 14, 831-897 (November 1957)

Introduction. --Infection of the flesh of cod (Gadus callarias) with nematodes is of considerable economic importance in most of the Gulf of St. Lawrence and in other marine areas of eastern Canada. Over 15,000 codfish and other species of fish fewer in number were examined in 1947 to 1953 in a survey of the incidence of nematode infection in fish taken along the coasts of Labrador, Quebec, New Brunswick, Nova Scotia, and Newfoundland. Krabbe reports that the most common nematode in the somatic musculature of fishes of the Northwest Atlantic is the Porrocaecum decipiens.

Methods and findings. --Fillets from ungutted codfish and other ungutted species, well iced and usually several days old, were examined on a candling table for nematodes. Two varieties of nematodes were found. These were variety A or Porrocaecum and variety B, which did not possess a caecum and had a longer pharynx than did Porrocaecum. Variety A was found in 94 percent of all codfish and in 86 percent of all American plaice, witch flounder, haddock, and redfish infected with nematodes. Variety A ranged from 15 to 58 millimeters (mm.) in length. Variety B was found in 6 percent of all cod and in 14 percent of all American plaice, witch flounder, haddock, and redfish infected with nematodes. Variety B was 17 to 34 mm. in length and resembled Anisakis; however, it could have been Eustoma.

A minimum level of infection, or 1 to 6 nematodes per 100 pounds of cod fillets, was found in codfish from Flemish Cap, the Grand Bank, the east coast of Newfoundland, the coast of Labrador, and southern St. Pierre Bank. A maximum level of infection, or 223 nematodes per 100 pounds of

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ABSTRACTER: Martin Heerdt

FISH FLAVORS IN FOOD

TMA TEST FOR FRESHNESS

2-THIOBARBITURIC ACID TEST FOR RANCIDITY

NEMATODES IN NEWFOUNDLAND COD

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of the first and at the end of the second day of storage at 38° F.

Taste panels.--A panel composed of seven members was used to evaluate the quality of the rosefish fillets, using sensory methods of evaluation. The individual members of the panel reached a 90 percent level of agreement in grading two lots of four samples for odor and appearance. In every instance the rating by odor agreed closely with the TMA value.

Results.--Tabulated results are shown below. Samples that were flat in taste showed TMA values that ranged from 5.2 to 17.6 and therefore, would be classified as putrid and unfit for human food. Two samples that showed excessive amounts of TMA were slightly off in taste but not inedible. These data indicate that a grade for the quality of rosefish fillets may be established on the basis of TMA values; however, the TMA value range now in use for cod should be extended to agree more closely with the taste evaluations.

Examination of rosefish fillets after storage at 38° F.

Lot No.	Appearance	Odor	Taste	TMA value
				mg./100 g.
		Stored for 1 day		
1	fair	flat	flat	10.08
2	good	normal	fresh	0.97
3	bad	extremely off	slightly off	54.9
4	fair	slightly off	flat	15.2
		Stored for 2 days		
1	fair	flat	flat	5.2
2	good	normal	fresh	1.7
3	fair	extremely off	slightly off	28.5
4	fair	flat	flat	17.6

6.199

Turkeys.--It is evident that turkeys are much more susceptible to the influence of fish products in the diet than are ordinary domestic fowls. There seems to be a definite species' difference, turkeys being susceptible, but hens and ducks are not.

Pigs.--Pigs definitely seem to be susceptible to the influence of fish products in the diet, and it is again the fish oil content of the meal that is the main source of trouble; if the oil can be stabilized in some way, it is less dangerous. Fish meals can, therefore, be safely fed to pigs provided that in doing so, the total amount of fish oil fed is not above certain limits, which should not be more than 25 g./day for porkers and not more than 10 g./day for baconers. This implies that the fat content of all fish meals that are fed must be known. As an additional precaution, it is generally recommended that pigs be taken off fish meal diets some time prior to slaughter, the periods mentioned varying from 2 weeks to 4 months, with one authority saying no period is necessary at all. An alternative method is to stop all fish products after the attainment of a certain live weight, say 100 lb. (45.4 kg.).

Cattle.--There are not many references on the feeding of fish meal to cattle and those that are available are mainly of a general nature. It is reported that dairy cows were given up to 2 lb. (0.91 kg.) of white fish meal per day for a period of 2 months without the milk becoming tainted, and that the flavor of the milk was unaffected either by exposing the milk to the odor of fish meal or by feeding cows 4 lb. (1.82 kg.) of fish meal 1 hr. before milking. Various recommendations are made concerning the quantities of fish meal to be used in the rations of dairy cows, fattening cattle, calves, sheep and horses.

Conclusion.--Despite the great diversity of opinion it is apparent that fish meals are useful feedstuffs and should not cause fishy tastes provided they are of good quality and are used intelligently.

There is a bibliog. of some 60 refs.

7.89

cod fillets, was found in codfish from the southern part of the Gulf of St. Lawrence. An intermediate level of infection, or 10 to 65 nematodes per 100 pounds of cod fillets, was found in codfish from other areas. The level of infection in fillets from large American plaice was similar to the level of infection in fillets from cod. The level of infection was high in fillets from smaller sizes of plaice and low in fillets from witch flounder, haddock, and redfish. Smelts living in the immediate neighborhood of seal colonies sometimes were highly infected with nematodes. Nematodes also were found in the fillets of the angler, Greenland cod, Greenland halibut, pollock, yellowtail flounder, longhorn sculpin, and tomcod. According to the data, the site of the original infection of the fish appears to be close to the site of deposition of nematode eggs by seal hosts. Invertebrates, or small fish that functioned as first intermediate hosts, did not appear to be particularly migratory.

Nematodes were most numerous in the thicker parts of the fish that were dorsal and posterior to the body cavity and least numerous in the thinner tail portion. This distribution is in agreement with the theory that nematodes enter the neighboring body muscles as they emerge from the stomach of the fish.

Of the seals that are the final hosts for Porrocaecum, harbor seals are common along the west coast of Newfoundland where nematode infection of codfish is high and in southern Labrador where nematode infection of cod is low. Intermediate vertebrates, or fish hosts, appear to be absent or few in number in Labrador and along the northeast coast of Newfoundland.

Conclusions.--The larger, browner, and more numerous Porrocaecum present a problem of commercial importance; whereas the smaller, whiter Anisakis do not present a commercial problem. Harbor and gray seals appear to be the only final hosts of Porrocaecum in many areas where harbor seals are present. As a practical solution to the problem, the authors suggest reducing the number of harbor seals and gray seals in the hope that the more numerous harp seal is not so important a final host as it appears to be in the Gulf of St. Lawrence. St. Mary's Bay, Newfoundland, has many advantages as an experimental area for the practical reduction of nematode levels in codfish flesh.

7.879

and fish offal constitute a large portion of the diet of fur-bearing animals and hatchery fish. Oxidative rancidity occurs in these materials after prolonged frozen storage. The rancid fats in these food materials cause a condition described as yellow fat disease in mink and swine. A similar condition has been observed by the authors in young chinook and silver salmon on diets containing rancid fats.

Ground tuna scrap from Thunnus germo was divided into four lots. Lot A was held as an untreated control. Lots B, C, and D were heated for 30 minutes at 121° C. in an autoclave. Lot B was retained as the processed control. Lot C was treated with 0.05 percent DPPD. Lot D was treated with 0.05 percent Tenox IV. All of the lots were stored tightly sealed in glass jars at -12° F. and TBA numbers were determined at various intervals of storage.

Results.--The application of heat to the tuna scrap caused a rapid drop in TBA number because of either a polymerization reaction or a reaction of malonaldehyde with the fat or protein. Volatilization was not involved. After one month of storage at -12° F., lot A had developed a strong rancid odor, whereas lot B became rancid somewhat more slowly and after 100 days of storage finally developed a strong odor. Lots A and B were definitely rancid after 280 days of storage at -12° F. Lots C and D showed little change in odor or TBA number throughout the 280 days of storage.

6.38 AMINO-ACID COMPOSITION OF SCLERO-PROTEIN OF THE SPONGE HIPPOSPONGIA EQUINA

Saper, J. and White, W. E. (The Laboratory, The Ely Brewery Co., Ltd., Cardiff, Wales)
Nature 181, 285-286 (January 25, 1958)

We have applied the method of paper partition chromatography to ascertain qualitatively the detailed amino-acid constitution of spongin, using the commercial unbleached honeycomb sponge, gathered in the eastern Mediterranean Sea. Our results differ in important respects from those of Low (J. Mar. Res., 10, 239 (1951)), who used this method to investigate the amino-acid constitution of the barium hydroxide hydrolysate of the sponge, Spongia officinalis obliqua, collected in the Gulf of Mexico.

We have examined both acid and alkaline hydrolysates of the sponge, previously washed with water and air dried. The acid hydrolysate was prepared by heating the sponge under reflux for 8 hr. with equal parts hydrochloric acid (6 N) and formic acid (85 percent), while the alkaline hydrolysate was obtained by heating under reflux for 8 hr. with saturated barium hydroxide solution. The solvents and various location agents were all prepared according to Smith, while this author's dipping technique was also used. For final confirmation all the spots were extracted and run as one-way chromatograms against known standards. The amino-acids identified in the acid and alkaline hydrolysates of spongin are tabulated (see over). The relative intensity of the amino-acid spots is indicated by representing strong as ++++ and weak as +.

Tryptophan was confirmed with the Ehrlich reagent; tyrosine and histidine with the diazo reagent; iodinated tyrosines with ceric sulphate-arsenious acid. Two very faint spots which could not be identified appeared in the chromatograms of the acid hydrolysate after dipping in ninhydrin. Spot A was characterized by an R_f of 0.23 in butanol/acetic acid and 0.63 in phenol/ammonia: spot B gave values of 0.25 and 0.82 in the corresponding solvents. Spot B (see table) together with two other very faint spots C and D were also observed in chromatograms of the alkaline hydrolysate. Spot C had R_f values of 0.16 and 0.62 and spot D 0.35 and 0.73 respectively in butanol/acetic acid and phenol/ammonia.

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8.9 PHYSICAL ANALYSIS OF TRAWLER FISH

Gunasekera, L. D. and Lantz, A. W. (Fisheries Research Station, Ceylon)
Ceylon Department of Fisheries, Progress Reports Biological and Technological No. 2, 48-50 (July 1956)

At the present time, Ceylon has no outlet for fish trimmings and unpopular varieties of fish caught incidentally by the trawler fishermen or the local fishermen. Economic utilization of all fish wastes, therefore, is one of the problems that the Ceylon Department of Fisheries and its fisheries technologists are attempting to solve. As much as 45 percent by weight of the fish caught may be discarded as waste. Any utilization, however, will depend to a large extent on the availability of the waste material and on basic technical data.

Purpose. --This study was made to provide the percentage composition by weight of the different physical components of a number of varieties of trawler caught fish.

Experimental. --For this study fish of each type or species were grouped as small, medium, or large. Fish were considered (1) small if they weighed less than 2 pounds, (2) medium if they weighed between 2 and 3 pounds, and (3) large if they weighed over 3 pounds. Three fish from each of these categories then were taken and dissected into the following component parts: (a) head, (b) guts, (c) body, (d) shoulder bones, and (e) scales. The head consisted of the gills, eyes, cheek, meat, gill covers, and cartilage. The "guts" included the heart, liver, entrails, pyloric caeca, bile sac, and spleen. The roe and fat when present were also grouped together, but their availability depends on the spawning period of the fish. The body included the fillets, skin, skeleton, tail, and trimmings.

During the analysis, the fish was cut into parts, a, b, c, d, and e; and each part was weighed

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ABSTRACTER: Martin Heerdt

8.53 FISH MEAL 4. CONDITION OF PILCHARDS AT WALVIS BAY

Stander, G. H. and Matthews, J. P.
Annual Report, Fishing Industry Research Institute, Cape Town, South Africa 9, 21-23 (1955-1956)

Pilchards were studied during the 1955 season for (1) the relation between moisture and fat content, (2) the relation between physical condition and fat content, and (3) the possibility of predicting the physical condition of pilchards after a periodic study of their fat content.

Experimental. -- Pilchards for assay were sampled from commercial catches. Each sample lot consisted of 25 to 50 fish that were used for physical measurements and 25 fish that were used for fat assay. Two or three lots of fish were tested each week.

Moisture-fat relation findings. --The sum of (a) the moisture, determined by drying to a constant weight at 102°C., and (b) the fat, determined by hexane extraction of dried samples, gave a nearly constant value. In the 66 samples that were examined, moisture plus fat ranged between 77.6 and 79.5 percent and averaged 78.6 percent, with a standard deviation of 0.407. An approximation of the fat content of pilchards, therefore, can be obtained by subtracting the value obtained by determining the moisture content of the pilchards from 78.6. The maximum error under these circumstances is about 1 percent or roughly 2 gallons of available oil per ton of fish. This error, however, usually will not exceed $\frac{1}{2}$ gallon of oil per ton of fish.

Physical condition versus fat content. -- A condition factor (K) for pilchards may be obtained by dividing the weight of the fish times 100 by the cube of the overall length of the fish. This formula, however, does not make an allowance for gonad weight. In two pilchards of the same length and weight, one might have a small gonad whereas the other might have a large gonad. In the latter

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ABSTRACTER: Martin Heerdt

9.16 LOBSTER AND OYSTER CULTURE AT PRINCE RUPERT, B. C.

Hipkins, Fred (Fishery Marketing Specialist, Bureau of Commercial Fisheries, U. S. Fish and Wildlife Service, Ketchikan, Alaska)
Commercial Fisheries Review 19, 62-64 (September 1957)

Successful experiments in transplanting eastern lobsters (Homarus americanus) and in cultivating Pacific oysters (Crassostrea gigas) have been in progress since 1954 near Prince Rupert, British Columbia, Canada. The development of these new commercial fishery enterprises in the northern waters of British Columbia may be applicable also to the inside coastal waters of Southeastern Alaska.

During the past decade, several attempts have been made to transplant the common or Northern lobster from Canada's Atlantic coast (Nova Scotia) to Nanaimo, Ladysmith, and Vancouver, B. C. on the Pacific coast. These projects were abandoned by 1954. However, a retired Canadian Naval officer was convinced that lobsters could be transplanted successfully into Western waters. In 1954, he obtained a permit from the Dominion Government to transplant Northern lobsters from the Atlantic coast and organized a company to do this at Prince Rupert.

Members of the firm selected a cove well situated on the Tsimpsean Peninsula across the harbor from Prince Rupert and obtained a deed giving the firm full possession of the tidelands. Live-pens for keeping the small lobsters were constructed, log rafts being used to support the pens in the water. The rafts were also ideal for attaching the "strings" of seed oysters.

The first shipment from Nova Scotia consisted of 70 small lobsters. Upon arrival, 69 were dead. Another test shipment was made in which a new type of container designed to be shockproof and heatproof was used. This container proved to be the answer for keeping the lobsters alive and in prime condition for the long journey across the country from Nova Scotia to Prince Rupert.

The pens were lined with fine-mesh screens of heavy-gauge stainless steel to keep the lobsters

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ABSTRACTER: Kathryn L. Osterhaug

COMPOSITION OF SPONGE PROTEIN

FAT AND WATER IN PILCHARDS

COMPOSITION OF FISH

LOBSTER AND OYSTER CULTURE

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pilchards, the K value would give a false indication of the condition of the fish. On the basis of these conditions, a second factor K-g was introduced in the equation $K\text{-}g = \frac{100 \times (\text{Body weight} - \text{Gonad weight})}{(\text{Overall length})^3}$.

Parallel assays of pilchards made to establish the relation between K, K-g, and fat content were summarized. Comparisons of measurements, such as average length versus percentage of males, followed no definite pattern and varied little from month to month. Body weight reached a peak of 124.3 grams during April, declined during August, and thereafter rose to a second peak in November. Gonad weight expressed as a percentage of the body weight completed two cycles in the course of a year. Fat content reached a maximum in June, dropped slightly during July, declined rapidly during August, and thereafter declined slowly until November. A similar trend was found in factory oil yields. Expected oil yield was computed from the experimental values for fat content by assuming a reduction ratio of 5.5 to 1, an average oil content of 8 percent in the fish meal, and an average stick water production of 1,300 pounds per ton of fish. This stick water had an oil content of 0.8 percent. The theoretical yield and the actual commercial yield were in close agreement; therefore, the experimental samples adequately represented the pilchards entering the meal plants.

Prediction of oil yield.--Day to day samples showed a large and irregular variation in fat content even when grouped and averaged for 10-day periods. A prediction of accuracy could be obtained by plotting either the monthly averages for experimental samples or the monthly averages for factory oil yields, provided the shape of the curve remains the same from year to year. The shape of the curve, however, is subject to annual variation.

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in the pens. After 52 days, the lobster were released, and immediately they went to the bottom of the cove. Some of the small lobsters found homes within the cove, whereas others migrated to the outside coastal waters.

The mortality rate appears to be high while the baby lobsters are going through the free surface-swimming period, and therefore it is impractical to make an estimate of how many lobsters migrated to the coastal areas and how many remained in the cove. Four lobsters released two years ago have been captured in the outside waters.

The lobsters maintained for spawning must be fed. Fish are often put in the pens for food, but crushed mussels are used as the main diet.

Although experimental lobster farming at Prince Rupert is still in the early stages, it can now be said that the Northern lobster of the Atlantic coast can be transplanted successfully to western waters.

In addition to lobster culture, oyster culture is being carried on. The seed oysters, which are attached to wires, are purchased in Japan and shipped to British Columbia. The wires are attached to floating logs on rafts. Although the hanging method, which is common in Japan, is new in British Columbia, it is being used successfully in Southeastern Alaska by a company at Ketchikan, Alaska.

Oyster spat, strung on soft stainless-steel wire, are lowered into the water from the log rafts. This method induces a rapid rate of growth. In one year, the oysters grow to cocktail size. After the first year, the oysters are removed from the wires, broken loose from the clusters, and scattered on the beaches at low-water mark for fattening. The time required for fattening depends on the condition of the water, such as the amount and kind of plankton it contains and the temperature. It is estimated that it will take six years to produce a large-size marketable oyster. The marketing of these oysters is expected to begin at Prince Rupert within the next two years.

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All the amino-acids identified by earlier workers were confirmed except α-aminobutyric acid, dibromotyrosine and methionine found by Low. No signs of these compounds could be detected, while oxidation of the valine spot with hydrogen peroxide failed to reveal any methionine. Contrary to Low's findings 3-iodotyrosine could not be detected in the alkaline hydrolysate, although it was identified in the acid hydrolysate. Considered together with the absence of 3:5-diiodotyrosine in the acid hydrolysate it is probable that the monoido-compound was present as an artefact.

	Alkaline hydrolysate	Acid hydrolysate	Relative intensity of amino-acid spot
Alanine	x	x	+++
γ-Aminobutyric acid	x		++
Arginine	x	x	+++
Aspartic acid	x	x	+++
Cystine	x		+
Glutamic acid	x	x	+++
Glycine	x	x	++
Histidine	x	x	++
Hydroxyproline	x	x	++++
Leucine-isoleucine	x	x	++++
Lysine	x		++
Ornithine	x		++
Phenylalanine	x	x	++++
Proline	x	x	++++
Serine	x		++
Threonine	x	x	++
Tryptophan	x		+
Tyrosine	x	x	++
3-Iodotyrosine		x	+
3:5-Diiodotyrosine	x		++
Valine	x	x	++

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separately. Then each part was dissected to obtain the weight of its various components.

Average percentage composition of species of trawler fish

	1	2	3	4	5	6	7	8	9	10
(a) HEAD	23·21	18·82	22·03	26·14	16·60	20·80	23·09	14·76	22·97	21·25
Gills	2·63	6·04	3·59	3·37	2·01	3·57	2·74	2·27	3·50	4·42
Eyes	1·23	—	1·42	1·24	0·79	1·05	1·37	1·15	0·98	1·16
Cheek meat	2·16	—	—	1·80	—	1·42	1·84	0·76	1·48	1·48
Gill-covers	8·83	5·64	6·04	7·66	6·77	7·09	8·47	6·04	9·96	6·82
Cartilage	7·85	6·51	7·18	8·42	5·62	7·11	7·59	4·16	6·31	7·74
(b) GUTS	3·82	6·78	5·48	3·79	5·98	5·80	4·07	10·26	6·30	5·14
Heart	0·17	—	—	—	—	0·11	0·17	0·41	0·32	0·29
Liver	0·58	—	—	0·65	1·32	0·74	0·59	1·32	1·01	1·05
Entrails before cleaning	2·80	3·78	3·90	2·57	3·09	3·59	2·56	6·34	3·28	2·90
Entrails after cleaning	1·65	2·41	3·24	1·30	1·71	2·43	1·47	1·98	2·61	1·55
Roe	—	—	—	—	1·00	—	1·62	2·94	5·36	
Pyloric caeca	—	—	—	—	—	0·41	—	0·65	0·9	1·18
Bile s.c	—	—	—	—	—	—	1·36	—	—	0·08
Spleen	—	—	—	—	—	—	0·12	—	—	0·14
(c) BODY	60·35	64·40	52·75	56·92	64·59	58·88	59·05	67·89	57·75	62·82
Fillets	33·14	39·90	20·88	28·44	36·68	32·19	31·54	42·66	33·42	37·60
Skin	3·75	·08	3·27	3·71	3·81	4·32	4·04	3·99	5·05	3·49
Skeleton and Tail	11·50	9·81	17·62	13·80	12·73	13·45	11·92	12·63	14·49	13·28
Tail and Fins	2·28	1·67	1·66	2·47	1·71	2·52	2·25	2·27	3·11	2·13
Tail	1·67	—	1·18	1·67	1·33	1·41	1·57	1·73	2·18	1·68
Trimmings	10·83	6·96	9·75	10·55	9·89	7·64	10·59	7·77	8·30	7·24
(d) SHOULDER BONES	7·34	4·94	7·13	8·76	6·64	8·58	8·25	4·21	9·92	7·14
(e) SCALES	3·64	—	8·78	3·81	2·23	3·03	2·66	0·91	1·57	7·76
(f) LOSS ON DISSECTION	1·64	4·26	3·83	1·58	4·05	3·31	3·88	3·29	3·68	3·17

(1) Sparus spinifer, (2) Rastrelliger kanagurta, (3) Muripristis murdjan, (4) Scolopsis bimaculatus, (5) Parupeneus indicus, (6) Lutjanus dodecanthus, (7) Lethrinus nebulosus, (8) Epinephelus undulosus, (9) Sphyraena jello, and (10) Caranx sp.

0.5 A NEW NONDESTRUCTIVE METHOD FOR THE BACTERIOLOGICAL SAMPLING OF MEATS

Silliker, J. H., Andrews, H. P., and Murphy, J. F. (Swift & Company Research Laboratories, Chicago, Illinois)
Food Technology 11, 317-318 (June 1957)

In place of destructive sampling, the authors pressed, with the aid of a sterile forceps and a spatula, sterile millipore filters saturated with sterile water against the surface of meat to be sampled. The filter after remaining in contact with the meat for 1 minute was removed, placed in a wide mouth bottle containing broken glass chips and 100 milliliters of sterile water and shaken mechanically for 2 minutes. Dilute solutions were plated out conventionally. Results were as reliable as those obtained with destructive sampling.

0.5 THE OCCURRENCE AND DISTRIBUTION OF BACTERIAL TYPES ON FLATFISH

Liston, J.
J. gen. Microbiol. 16, 205-216 (1957)
Food Science Abstracts 29, 312 (August 1957)

Analyses of 1,700 strains of bacteria isolated from skate and lemon sole, and grown on seawater agar media, showed respectively: Pseudomonas 60 and 53%, Achromobacter 14 and 13%, Alcaligenes 8 and 6%, Flavobacterium 5 and 9%, Corynebacterium 1 and 2%, cocci 1 and 3%, "gut group" vibrios 9 and 12%, miscellaneous 2 and 2%. Luminous strains (mainly in the gut contents), and agar-digesting strains, occurred seasonally. The populations of skin and gills were composed mainly of species of Pseudomonas and Achromobacter.

2.6 FISH AND SHELLFISH CONSUMPTION IN PUBLIC EATING AND DRINKING PLACES

Anonymous
Special Scientific Report: Fisheries No. 218, 93 pp. (June 1957) U. S. Fish and Wildlife Service, Washington 25, D. C.

Eating and drinking places constitute an important market for food products estimated to represent about 27 percent of the total value of all food and beverages marketed for human consumption. It is estimated that fish and shellfish sales in public eating places during 1955 amounted to well over $250,000,000 at the retail level. In terms of volume, they amounted to about 25 percent of the total quantity of all fishery products marketed in the United States. For fresh and frozen fish, the proportion consumed in public eating places is estimated at 37 percent while that for shellfish is about 51 percent.

2.8 FROZEN MEAT COOKERY--A GUIDE TO EASY PREPARATION

Anonymous
Quick Frozen Foods 19, 154, 156-157 (May 1957)

2.00 FRESH FISH 2. CHLOROMYXUM THYRISITES IN VARIOUS SOUTH AFRICAN FISHES

Rowan, M. K.
Annual Report, Fishing Industry Research Institute, Cape Town, South Africa 9, 7-8 (1955-1956)

(Abstract of this article appears under 9.15 page 17 - February 1958)

2.00 STUDIES ON THE COMPLETE UTILIZATION OF SQUID (OMMASTREPHES SLOANI PACIFICUS) XII. ON THE DIFFERENCE OF DECOMPOSABLE VELOCITIES OF SUMMER AND AUTUMN SQUID MEAT

Tanikawa, Eiichi; Motohiro, Terushige, Ishiko, Hirotoshi, Fujii, Yutaka, and Yachi, Kenjiro
Bulletin of the Faculty of Fisheries, Hokkaido University 7, No. 1, 49-61 (May 1956) (English abstract, figures, and tables)

The authors have ascertained differences in the rate of change in freshness, autolysis, histological aspect, chemical components, solubility, and the amount of bound water for dried, frozen, or salted squid meat.

3.12 STUDIES ON THE ANTIBIOTIC ACTION OF FISH COMPONENTS--X. THE ANTIBIOTIC ACTION OF CARBONYL COMPOUNDS IN AUTO-OXIDIZED METHYL ESTERS OF FATTY ACIDS DERIVED FROM SHARK LIVER OIL

Toyomizu, Masamichi (Kyushu University, Fukuoka)
Bulletin of the Japanese Society of Scientific Fisheries 23, No. 1, 33-36 (1957)

The antibiotic substance in the auto-oxidized fatty acids derived from shark liver oil was a main constituent of the substances which were colored with thiobarbituric acid. A carbonyl compound separated from the auto-oxidized methyl esters inhibited microbial growth.

3.12 STUDIES ON THE MECHANISM OF ANTIBIOTIC ACTION OF VITAMIN K IV. EFFECT OF VITAMIN K ON HYDROLYTIC ENZYMES

Kitamikado, Manabu
Bulletin of the Japanese Society of Scientific Fisheries 23, No. 2, 120-123 (1957) (English synopsis and tables)

The only possible interfering point of the compounds with enzymes is the active SH group.

3.12 ANTIBIOTIC PRESERVATION OF WHALE CARCASSES

Anonymous
Chemistry and Industry No. 6, 167-168 (February 8, 1958)

If oxytetracycline was injected into whales just after harpooning to prevent decay of the carcasses, 90 percent of the oil obtained from them was of first-grade quality; whereas if no antibiotic was used, only 65 percent of the oil obtained was of first-grade quality.

3.19 COMPLEMENTARY EFFECTS OF HEAT AND IONIZING RADIATION

Kan, B.; Goldblith, S. A.; and Proctor, B. E. (Dept. of Food Technology, Massachusetts Institute of Technology, Cambridge)
Food Research 22, 509-518 (September-October 1957)

The observation that doses of gamma radiation can increase the sensitivity of bacterial spores to heat has been confirmed with Cameron's Putrefactive Anaerobe No. 3679 and Bacillus cereus var. terminalis spores. It was also found that cultures of P. A. No. 3679 spores were similarly affected in ham menstra of 3.5% and 22% solids and that the radiosensitivity of the anaerobe is not significantly affected by two different lethal preheating treatments.

3.19 NUTRITIVE VALUE OF IRRADIATED TURKEY II. VITAMIN LOSSES AFTER IRRADIATION AND COOKING

Thomas, Miriam Higgins and Calloway, Doris Howes (Quartermaster Food and Container Institute for the Armed Forces)
Journal of the American Dietetic Association 33, 1030-1033 (October 1957)

Thiamine was severely affected by gamma irradiation doses of 2, 3, and 6 x 10^6 rep, the destruction increasing from 65 to 90 percent with the increase in dose. Riboflavin was more resistant to irradiation than thiamine. A loss of 6, 14, and 17 percent riboflavin occurred after turkey was treated with 2, 3, and 6 megarep, respectively. Niacin was not affected by irradiation.

3.231 A FIELD EVALUATION OF THE PERFORMANCE OF VAPOR-VENTED INSULATION IN A LARGE FREEZER WAREHOUSE

Queer, E. R. and McLaughlin, E. R.
Refrig. Engr. 64, 29-34, 84-85 of No. 1; 45, 88, 90, 92, 94 of No. 3 (1956)
Food Science Abstracts 29, 295 (June 1957)

3.231 INFLUENCE OF INSULATION ON MOISTURE-CONDENSATION ASPECTS OF A STEEL-FRAMED COLD-STORAGE WAREHOUSE STRUCTURE

Kayan, C. F. and Gates, R. G. (Columbia University, New York)
Refrigerating Engineering 66, 39, 40-44 (January 1958)

3.231 VAPOR-PROOFS FREEZER UNIT WITH LOW-COST SHEETING

Anonymous
Food Engineering 30, 119 (January 1958)

Effective moisture barrier achieved with a 1-mil-thick aluminum film laminated between two ½-mil films of Mylar polyester. Technique provides a continuous, unbroken, protective "envelope."

3.4 ANALYSIS OF DYNAMICS OF SMOKING BASED ON CHEMICO-PHYSICAL CRITERIA

Tilgner, D. J. and Pietrzyk, M.
Przem. Spozyw. 10, 461-464 (1956)
Food Science Abstracts 29, 213 (June 1957)

3.4 AUTOMATIC FISH DRYING AND SMOKING OVENS

Anonymous
Food Tr. Rev. 26, 17-18 (1956)
Food Science Abstracts 29, 308 (August 1957)

A description of the Kvaerner drying, smoking, and cooking ovens for handling brisling and sild sardines in a new cannery at Whitstable.

3.4 PRODUCTION OF SMOKE [FOR PRESERVATION OF MEAT] AND ITS CHEMICAL COMPOSITION

Ziemba, Zenon
Przemysl Spozywczy 11, 200-5 (1957)
Chemical Abstracts 52, 2295 (February 10, 1958)

A crit. review of the suitability of various types of wood, their chem. compn., and chemistry of pyrolysis. In the smoke of oak and beechwood there are 0.5 to 3 g./cu.m. of solid and liquid substances of which 40 to 60 mg./cu.m. are unidentified free bases. The smoke of oak wood contains more acid than that of beechwood and produces inferior smoked fish. Almost one-third of the chemical substances of that smoke undergoes condensation and oxidation.

4.13 SOUTH AFRICAN PILCHARD OIL 6. THEISOLATION AND STRUCTURE OF A DOCOSAHEXAENOIC ACID FROM SOUTH AFRICAN PILCHARD OIL

Whitcutt, J. M. (South African Council for Scientific and Industrial Research, Pretoria, South Africa)
The Biochemical Journal 67, 60-64 (September 1957)

Docosahexaenoic acid has been isolated from South African pilchard oil. Some of its properties have been determined and its degree of purity is discussed. Evidence is presented that the main component is the 4:7:10:13:16:19-hexane.

4.13 FATTY OILS OF AQUATIC INVERTEBRATES IV. FATTY ACIDS AND STEROLS IN THE FAT OF SPISULA SACHALINENSIS

Toyama, Yoshiyuki and Takagi, Toru (Nagoya Univ.)
Nippon Kagaku Zasshi 75, 1238-41 (1954)
Chemical Abstracts 51, 18656 (November 25, 1957)

The fatty acid component of S. Sachalinensis contained 0.8% C_{14}, 12.4% C_{16}, 4.3% C_{18} and higher satd. acids, and 15.3% C_{16}, 33.7% C_{18}, 23.1% C_{20}, 10.4% C_{22} unsatd. acids.

4.13 FATTY OILS OF AQUATIC INVERTEBRATES VII. PROPERTIES OF THE FATS FROM ELEVEN SPECIES OF JAPANESE SHELLFISH

Toyama, Yoshiyuki and Takagi, Toru (Nagoya Univ.)
Nippon Kagaku Zasshi 76, 240-3 (1955)
Chemical Abstracts 51, 18656 (November 25, 1957)

4.29 THE SYNTHESIS OF A 1:5-DIENOIC ACID AND ITS BEHAVIOR WITH HOT ALKALI

Surville, B. M. A.; Rivett, D. E. A.; and Sutton, D. A. (National Chemical Research Laboratory, Pretoria, South Africa)
Journal of the Chemical Society (London) pp. 3304-3305 (July 1957)

From the behavior of squalene it has been assumed that acids containing the di-cis-system $\cdot CH{:}CH \cdot CH_2CH{:}CH \cdot$ would not become conjugated when treated with alkali. To check this assumption, the authors synthesized trideca-cis-5:cis-9-dienoic acid using Strong's unambiguous acetylenic route. After treatment with 21% potassium hydroxide in ethylene glycol at 180° for 30 min. less than 2% of conjugated diene was formed. The results of this study do not confirm proposed penta-1:5- denyl structures for some of the highly unsaturated acids from fish oils.

4.29 CONJUGATED FATTY ACIDS. II. THE THERMAL POLYMERIZATION OF THE CONJUGATED FISH OIL OBTAINED BY THE NICKEL-ON-CARBON CATALYST ISOMERIZATION

Tsuchiya, Yasuhiko and Kayama, Mitsu (Tohoku Univ., Sendai)
Tohoku J. Agr. Research 7, 277-89 (1957) (Japan)
Chemical Abstracts 52, 2428 (February 10, 1958)

4.29 THE ADDITION OF THIOCYANOGEN TO UNSATURATED FATS. I. CATALYTIC INFLUENCE OF $HgCl_2$

Chakrabarty, S. K.; Ganguly, D.; and Goswami, M. N. (Univ. Coll. Sci. Technol., Calcutta)
J. Indian Chem. Soc., Ind. & News Ed. 20, 6-10 (1957)
Chemical Abstracts 52, 2427 (February 10, 1958)

4.5 POLAROGRAPHIC STUDIES ON THE RANCID FISH-OIL--III.

Kikuchi, Takeaki and Okada, Ikunosuke
Bulletin of the Japanese Society of Scientific Fisheries 23, No. 1, 41-43 (1957) (English synopsis, table, and figures)

The polarographic wave that was reduced at the potential of -1.9 V vs S. C. E. in oxidized oil is caused by the carbonyl compound produced during the oxidation.

4.5 POLAROGRAPHIC STUDIES ON THE RANCID FISH-OIL

Kikuchi, Takeaki and Okada, Ikunosuke
Bulletin of the Japanese Society of Scientific Fisheries 23, No. 3, 177-180, 181-184 (1957) (English synopsis, figures, and tables)

IV. A chromatography of 2,4-dinitrophenylhydrazones of the volatile compounds has been carried out.

V. A separation of the volatile compounds produced during the auto-oxidation of fats and oils by systematic steam distillation, revealed that the compound giving a polarographic wave was an aldehyde fraction of the volatile matter formed in the auto-oxidation of the fats and oils.

4.64 VITAMIN A AND CAROTENE STABILITY IN FEEDS CONTAINING ANTIOXIDANT TREATED ANIMAL FATS

Siedler, A. J.; Enzer, E., Schweigert, B. S., and Riemenschneider, R. W.
J. Agric. & Food Chem., 4, 1023-1029 (1956)
Food Science Abstracts 29, 232 (June 1957)

Tests on commercial poultry foods containing 6% of animal fat treated with 0.2% of an antioxidant showed that all the antioxidants used increased the stability of vitamin A, carotene, and fat in the feeds, compared with feeds containing no fat, or unstabilized fat. Santoquin (6-ethoxy-2,2,4-trimethyl-1,2-dihydroquinoline) was the most effective antioxidant, followed closely by N,N'-diphenyl-p-phenylenediamine, butylated hydroxytoluene, and butylated hydroxyanisole + butylated hydroxytoluene.

4.64 TRIHYDROXYBUTYROPHENONE--A FOOD GRADE ANTIOXIDANT

Stuckey, Ben N. and Gearhart, W. M. (Eastman Chemical Products, Eastman Kodak Co., Kingsport, Tennessee)
Food Technology 11, 676-679 (December 1957)

2,4,5-Trihydroxybutyrophenone, a food grade antioxidant, was compared with butylated hydroxyanisole, butylated hydroxytoluene, and propyl gallate. In edible fats, it was shown to produce initial stability equal to propyl gallate but had little or no carry-through properties in baked goods. It was found to be extremely active in vitamin A, yellow grease and paraffin wax.

4.91 THE INFLUENCE OF DIETARY FATS ON SERUM-LIPIDE LEVELS IN MAN

Ahrens, Edward H., Jr.; Hirsch, Jules; Insull, William, Jr.; Blomstrand, Rolf; Tsaltas, Theodore T.; and Peterson, Malcolm L. (The Rockefeller Institute, New York)
The Journal of the American Oil Chemists' Society 34, 563-570 (November 1957)

This study favors the hypothesis that serum lipides can be lowered by ingestion of highly unsaturated oils. Recommendations for radical changes in food habits, even by those populations most seriously threatened by atherosclerosis, however, should await a clearer definition of the specific food factors that control serum-lipide levels.

4.91 NEWER CONCEPTS OF THE ROLE OF ESSENTIAL FATTY ACIDS

Slater-Alfin, Roslyn B. (University of Southern California, Los Angeles)
The Journal of the American Oil Chemists' Society 34, 574-578 (November 1957)

Essential fatty acids are used for the esterification of cholesterol. In the absence of essential fatty acids, cholesterol is esterified with more saturated fatty acids, which are less labile and tend to accumulate. Essential fatty acids are required for phospholipide synthesis. The possibility also exists that essential fatty acids are involved in certain enzyme systems that regulate cholesterol metabolism.

4.91 ESSENTIAL FATTY ACIDS IN HUMAN NUTRITION

Hansen, Arild E. (University of Texas School of Medicine, Galveston)
Food and Nutrition News 29, No. 5 (February 1958)

LIST OF PUBLICATIONS REGULARLY ABSTRACTED

Analyst
Analytical Chemistry
Archives of Biochemistry and Biophysics
Biochemical Journal
Bulletin of the Faculty of Fisheries, Hokkaido University
Bulletin of the Japanese Society of Scientific Fisheries
California Fish and Game
Canadian Fisherman
Canadian Journal of Chemistry
Canadian Journal of Technology
Canner and Freezer
Chemical Abstracts
Chemical and Engineering News
Chemical Engineering
Chemical Processing
Chemistry and Industry
Commercial Fisheries Review
Drug and Cosmetic Industry
FAO Fisheries Bulletin
Federation Proceedings
Feed Bag (supersedes Flour and Feed)
Feedstuffs
Fisheries Newsletter (Australia)
Fish. Res. Bd. Can., Prog. Repts. Atlantic Coast Stas.
Fish. Res. Bd. Can., Prog. Repts. Pacific Coast Stas.
Fishing Gazette
Food Engineering
Food Manufacture
Food Packer
Food Preservation Quarterly
Food Processing
Food Research
Food Science Abstracts
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Industrial and Engineering Chemistry
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Journal of Agricultural and Food Chemistry
Journal of Applied Chemistry
Journal of Biological Chemistry
Journal of Nutrition
Journal of the American Chemical Society
Journal of the American Dietetic Association
Journal of the American Oil Chemists' Society
Journal of the Association of Official Agricultural Chemists
Journal of the Fisheries Research Board of Canada
Journal of the Science of Food and Agriculture
Maine Coast Fisherman
Modern Packaging
Modern Refrigeration
National Fisherman
National Provisioner
Nature
Nutrition Reviews
Pacific Fisherman
Pan American Fisherman
Poultry Science
Practical Home Economics
Progressive Fish-Culturist
Quick Frozen Foods
Refrigerating Engineering
Report of the Food Investigation Board (Great Britain)
Science
Southern Fisherman
Trade News (Fisheries Department, Canada)
Western Fisheries
World Fisheries Abstracts
World Fishing

Articles chosen for abstracting or inclusion as bibliographical references are those deemed of interest to the commercial fisheries and to fishery technological laboratories. Occasionally pertinent articles from sources other than the above listed publications are included. Biological papers are generally omitted.

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Editorial Clerk (Typist)--Gladys K. Chandler

4.92 THE RELATIONSHIP OF PYRIDOXINE AND RIBOFLAVIN TO THE NUTRITIONAL VALUE OF POLYMERIZED FATS

Witting, L. A.; Nishida, T.; Johnson, O. C.; and Kummerow, F. A. (Department of Food Technology, University of Illinois, Urbana)
The Journal of the American Oil Chemists' Society 34, 421-424 (September 1957)

The nutritive value of different polymerized fats was compared by feeding them at a 10 percent level to weanling rats that were kept on 3 different basal rations and various vitamin supplements. Auto-oxidatively or thermally auto-oxidatively polymerized fats depressed growth, and thermally polymerized fats were toxic to rats. Growth depression and toxicity at low protein levels were partially overcome by supplementation of the diet with pyridoxine. Riboflavin apparently aided the rats in coping with auto-oxidized fat but not thermal polymers.

4.92 POISONING WITH RANCID COD-LIVER OIL IN SILVER FOXES

Kaszubkiewicz, Cz.; Wartenberg, L.; and Zwierzchowski, J. (Wyzsza Szkola Rolna, Wroclaw)
Med. Weterynar. (Poland) 13, 228-33 (1957)
Chemical Abstracts 52, 2299 (February 10, 1958)

Fatal poisoning of silver foxes was caused by rancid fish oil used as a feed supplement. Chem. analysis of the oil showed high degree of rancidity: peroxide no. 18.9 (vs. 3.0 for the fresh cod-liver oil), acid no. 24.3, I no. 152, and a pos. Kreis test for aldehydes. Biol. tests conducted on white rats confirmed the poisoning effect of the oil.

6.53 THIAMINE DEFICIENCY IN CATS

Anonymous
Nutrition Reviews 15, 190-191 (June 1957)

(Abstract of this article appears under 6.52 page 19 - November 1957)

6.53 RESEARCH ON DOG FEEDS AT CORNELL UNIVERSITY

McCoy, C. M.; Huang, T. C.; Ramseyer, W.; Stevens, A.; and Palmer, K. M.
Feedstuffs 29, 66-67, 68-69, 70, 72-73, 74 (September 7, 1957)

This article outlines and summarizes growth studies with beagle and cocker spaniel pups, which were fed various rations in Cornell University tests. Both meal and biscuit type dog feeds were used, and their formulas are part of the article. Results achieved with the various formulas are given.

6.53 STATISTICS ABOUT DOGS AND THEIR OWNERS

Barton, Sam G. (Market Research Corporation of American, New York)
Feedstuffs 29, 28-29, 30, 31 (September 7, 1957)

The author outlines statistics about dogs and their owners based on a survey of the National Consumer Panel, a group comprising more than 6,000 families across the United States. The article and charts relate such factors as city size, family size, age, education, occupation, and TV ownership to dog ownership.

6.54 FISH FLOUR--A WEAPON AGAINST PROTEIN MALNUTRITION

Anonymous
Commercial Fisheries Review 19, 17 (April 1957)

Dr. James M. Hundley, nutrition advisor to the United Nations, reported that several processes have been developed by which either fresh fish or dehydrated fish meal can be defatted, deodorized, and finished as an almost tasteless, odorless, nearly white flour. Dr. Hundley said that such flour contains 70 to 80 percent protein and that relatively small amounts are needed to supplement bread and other cereal products. Estimates are that only about one-fourth cent a day would be required to supplement a child's diet effectively with fish flour.

6.54 BIOLOGICAL VALUE OF THE PROTEINS OF A VARIETY OF FISH MEALS

Bender, A. E. and Haizelden, S.
Brit. J. Nutrit., 11, 43-43 (1957)
Food Science Abstracts 29, 425 (October 1957)

A series of 27 fish meals and flours, intended for human consumption, showed net protein utilizations of 18 to 80, and digestibilities ranging from 47 to 97%, in experiments with rats by the carcass-analysis method. The biological values of the proteins ranged from 36 to 82. Defatting and deodorizing apparently caused no serius damage to protein quality.

7.610 REPORT ON VITAMIN A IN MIXED FEEDS

Parrish, D. B. (Kansas Agricultural Experiment Station, Manhattan)
Journal of the Association of Official Agricultural Chemists 40, 365-376 (August 15, 1957)

Development of a suitable method for determining vitamin A in mixed feeds has been complicated by introduction of various stabilized vitamin A products, use of low levels of vitamin A, changes in the composition of commercial feeds, and addition of DPPD (diphenylphenylenediamine).

7.610 POLAROGRAPHIC DETERMINATION OF VITAMIN A IN FISH-LIVER OIL

Keller, W. and Weiss, F. (Humboldt Univ., Berlin, Germany)
Z. anal. Chem. 154, 241-5 (1957)
Chemical Abstracts 51, 13317 (September 10, 1957)

The fish-liver oil is sapond. with alc. KOH. The unsaponifiable is extd. with Et_2O, and the ext. is passed through an Al_2O_3 column. The vitamin A is eluted with 7.5 ml. Et_2O + 42.5 ml. ligroine. The solvent is evapd., the residue taken up in MeOH, and the vitamin A measured polarographically.

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7.8 EVALUATING FLAVOR DIFFERENCES IN CANNED FOODS I. GENESIS OF THE SIMPLIFIED PROCEDURE FOR MAKING FLAVOR DIFFERENCE TESTS

Mahoney, Charles H.; Stier, Howard L.; and Crosby, Edwin A. (National Canners Association, Washington, D. C.)
Food Technology 11, 29-36 (September 1957)

The multiple comparison method with a reference sample is more accurate and efficient than the modified triangular method in the evaluation of flavor differences, especially when the differences are not very great.

7.8 EVALUATING FLAVOR DIFFERENCES IN CANNED FOODS II. FUNDAMENTALS OF THE SIMPLIFIED PROCEDURES

Mahoney, Charles H.; Stier, Howard L.; and Crosby, Edwin A. (National Canners Association, Washington, D. C.)
Food Technology 11, 37-43 (September 1957)

The procedure is comparable to the multiple comparison procedure described by Kramer (Food Technology 10, 155-159 [1956]). The degree of flavor difference for each numbered sample is determined by flavor comparisons with the reference sample; then the flavor of the numbered sample is rated as acceptable or not acceptable.

8.51 ZINC AND INSULIN IN THE PANCREAS OF BONY FISHES

Weitzel, Gunther; Strecker, Franz Josef; Roester, Ursula; Fretzdorff, Anna Maria; and Buddecke, Eckhardt (Max Planck Inst., Gottingen, Ger.)
Hoppe-Seyler's Z. physiol. Chem., 295, 83-106 (1953)
Chemical Abstracts 51,5314 (April 10, 1957)

8.51 THE AMINO ACID COMPOSITION OF AMPHIBIAN REPTILE AND AVIAN GELATINS

Leach, A. A. (The British Gelatine and Glue Research Association, 2a Dalmeny Avenue, Holloway, London, N7)
The Biochemical Journal 67, 83-87 (September 1957)

The amino acid composition of gelatins from two reptiles, an amphibian and a bird, has been determined by ion-exchange chromatography.

8.51 IDENTIFICATION AND DISTRIBUTION OF 5-HYDROXYTRYPTAMINE IN A SEA ANEMONE

Mathias, A. P.; Ross, D. M.; Schachter, M. (University College, London)
Nature 180, 658-659 (September 28, 1957)

The authors have identified 5-hydroxytryptamine in the tentacles, column (body wall), and in the structures of the coeleteron (comprising mesenteries, gastric filaments, gonads, acontia, etc.) of the sea anemone Calliactis parasitica.

8.59 THE INTERACTION OF SUGARS AND PROTEINACEOUS SUBSTANCES OF OLEAGINOUS SEEDS IN THE PROCESS OF OIL MILLING

Rjechin, V. P.
Journal of the American Oil Chemists' Society 34, 8 (July 1957)

(Abstract of this article appears under 0.33 page 1 - February 1958)

8.59 THE DISTRIBUTION OF GUANIDINES, PHOSPHAGENS AND N-AMIDINO PHOSPHOKINASES IN ECHINOIDS

Griffiths, D. E.; Morrison, J. F.; and Ennor, A. H. (Department of Biochemistry, The Australian National University, Canberra, A.C.T., Australia)
The Biochemical Journal 65, 612-617 (April 1957)

Centrostephanus rodgersii has been shown to contain arginine, phosphoarginine and arginine phosphokinase. Heliocidaris erythrogramma, on the other hand, contained both creatine and arginine together with their phosphorylated derivatives and N-amidino phosphokinases.

8.59 STUDIES ON MUSCLE OF AQUATIC ANIMALS XV. IMIDAZOLE COMPOUNDS IN FISH MUSCLES, WITH SPECIAL REFERENCE TO THE TASTE OF RED-MUSCLE FISHES

Shimizu, W.; Higashi, T.; and Ishikawa, T.
Bull. Res. Inst. Food Sci., Kyoto Univ., No. 10, pp. 78-82 (1952)
Food Science Abstracts 29, 131 (April 1957)

8.64 NUTRITIVE VALUE OF FISH I. NICOTINIC ACID, RIBOFLAVIN, VITAMIN B_{12}, AND AMINO ACIDS OF VARIOUS SALT-WATER SPECIES

Teeri, A. E.; Loughlin, M. E.; and Josselyn, D.
Food Research 22, 145-150 (March-April 1957)

(Abstract of this article appears under 8.0 page 15 - October 1957)

8.64 INVESTIGATIONS ON SHARK LIVER RESIDUE: DETERMINATION OF B VITAMINS AND PREPARATION OF PROTEOLYSED EXTRACTS

Rajagopalan, K. V. and Sarma, P. S.
J. sci. industr. Res., India 15C, 227-231 (1956)
Food Science Abstracts 29, 217 (June 1957)

8.64 VITAMIN CONTENT OF FOODS EXPOSED TO IONIZING RADIATIONS

Ziporin, Z. Z.; Kraybill, H. F.; and Thach, H. J. (U. S. Army Medical Nutrition Laboratory, Denver, Colorado)
The Journal of Nutrition 63, 201-209 (October 10, 1957)

In eight foods analyzed--namely, haddock, beef, turkey, ham (fresh), bacon, peaches, powdered milk, and beets--turkey showed a significant decrease in riboflavin. Thiamine was destroyed to the extent of 70 to 95 percent in all foods tested except powdered milk. Vitamins in foods are less radiosensitive than those in pure solution. The degradation of thiamine occurs by the splitting of the molecule into pyrimidine and thiazole moities.

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